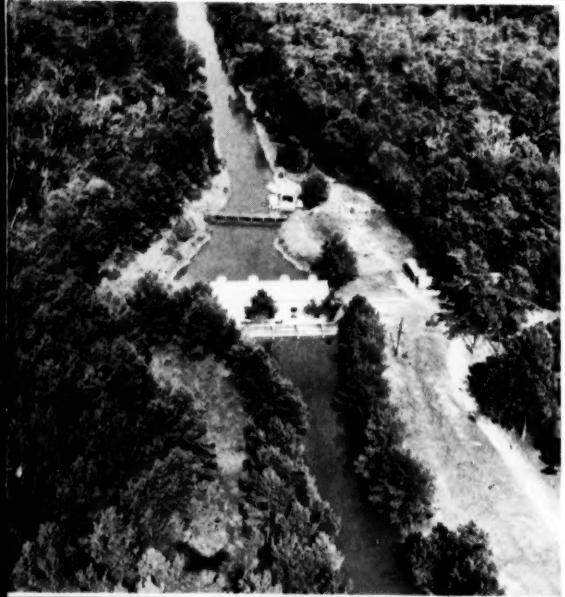


Chemical Week

October 30, 1954

Price 35 cents



Sulfuric acid 10 years hence; here are why's and where's of sales and sources p. 33

► **Sabine River is slated for new role in bi-state program to shore up Southwest water supply . p. 16**

New viscometer weds practice and theory, smooths research on hard-to-figure thixotropics p. 72

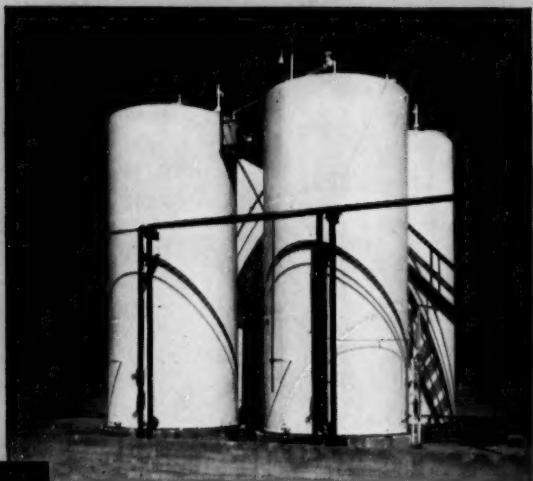
Tripoly makers move near markets, jockey for position in race to capture outlets p. 90

► **Teardown's out, tailored detergents are in as dairies swing to in-place cleaning p. 94**

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**New paint
lasts years
...resists
corrosive spillage
at
Diamond Alkali
plant**



HERE'S HOW...

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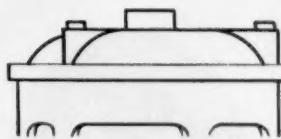
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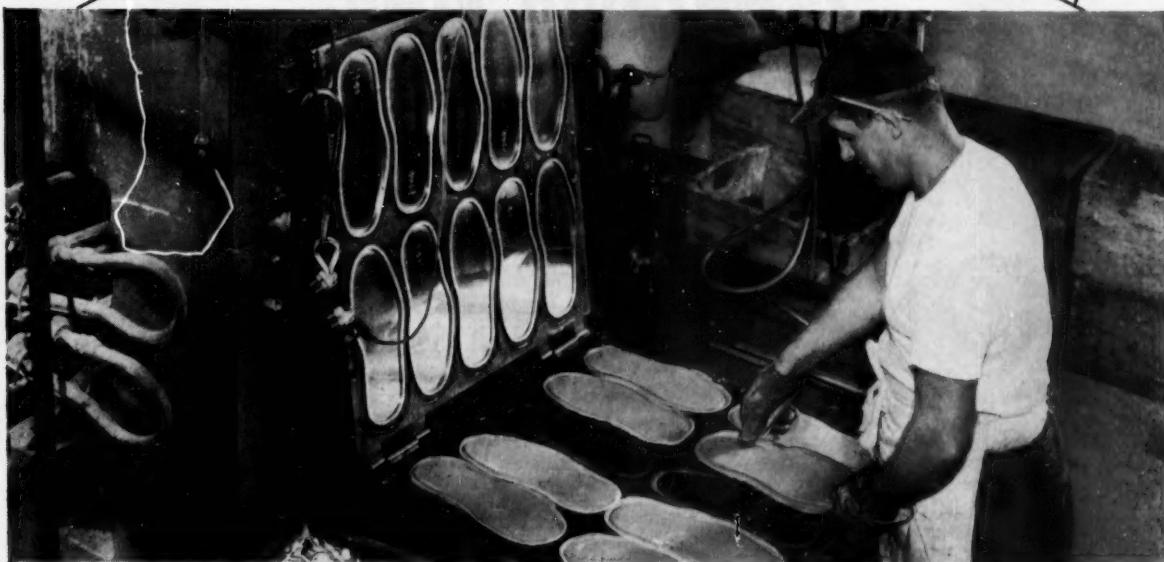
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The Resin that might mold your future

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UNITED STATES STEEL

Chemical Week—

Volume 75

October 30, 1954

Number 18

OPINION	6	DISTRIBUTION	44
NEWSLETTER	9	PRODUCTION	62
BUSINESS & INDUSTRY	11	RESEARCH	72
CHEMICAL WEEK REPORT ..	33	MARKETS	87
SPECIALTIES			
94			



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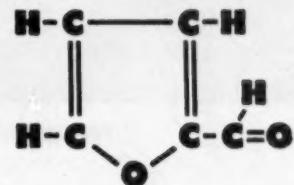
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Furfural will help you



DESCRIPTION

An amber-colored, mobile liquid with a pungent odor like oil of bitter almonds.

TYPICAL ANALYSIS

Specific Gravity (20/20°C.) 1.161
 Boiling Point, °C. (Todd Still),
 744 mm. 160 (98%)

OTHER PROPERTIES

Freezing Point, °C.	-36.5
Flash Point (open cup) °C.	56.8
Refractive Index (n 25/D)	1.5230
Surface Tension at 20°C.	
(dynes/cm)	49.
Viscosity (Centipoises)	
38°C.	1.35
54°C.	1.09

In addition to properties it possesses in common with other aldehydes, furfural exhibits a chemical behavior peculiar to the unsaturated furan nucleus. As a consequence it is commanding increasing interest as a chemical intermediate.

Its versatility, its high purity, and its low price are reasons why you should evaluate furfural in processes and products involving its use as a selective solvent, resin ingredient, general solvent, wetting agent, and chemical intermediate.

Write for Bulletin 204. A few words as to the nature of your interest will enable us to select for you other pertinent literature. Address request to nearest office listed below.

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Phosphorus thiochloride is a faint yellow to colorless liquid with a distillation range of 120-125°C. Typical analysis: 18.5% phosphorus and 18.6% sulfur. Uses: Intermediate in chemical manufacture. Typical end products are oil additives, ore flotation agents, and insecticides containing both phosphorus and sulfur.

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Mol. Wt. 179. Specific gravity 1.315 at 25°C. Boiling point 224.6°C. at atmospheric pressure. A colorless liquid which fumes in air. It is a highly reactive acid chloride which hydrolyzes in water and reacts with alcohols, phenols, amines, and aldehydes. Adds oxygen, sulfur and halogens. Suggested uses: As an intermediate in organic synthesis.

BENZENE PHOSPHORUS OXYDICHLORIDE (Phenylphosphonic Dichloride)



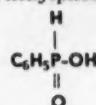
Mol. Wt. 195. Specific gravity 1.375 at 20°C. Boiling point 258°C. (atm.). Colorless liquid of faint fruity odor. Soluble in benzene, chloroform, carbon tetrachloride. It is a reactive acid chloride. Suggested uses are: As an intermediate for synthesis of plasticizers and oil additives, and in general organic synthesis.

BENZENE PHOSPHORUS THIODICHLORIDE (Phenylphosphonothioic Dichloride)



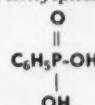
Mol. Wt. 211. Specific gravity 1.376 at 13°C. Boiling point 205°C. at 130 mm. A colorless liquid which fumes slightly in air. It is a reactive acid chloride which hydrolyzes very slowly in water but reacts with alcohols, phenols, and amines. Suggested uses are: As an intermediate in organic synthesis and as an additive in extreme pressure lubricants.

BENZENE PHOSPHINIC ACID (Phenylphosphinic Acid)



Mol. Wt. 142. Specific gravity 1.376 (29°C.). Melting point 82-84°C. Strong monobasic acid; colorless crystals. Acid strength: $\text{pK}_1 = 1.47$. Soluble in water, alcohol, and acetone. Slightly soluble in ether. Insoluble in benzene, hexane, and carbon tet. Stable in air. Decomposes at 200°C. with formation of phenylphosphine. Oxidizes to the phosphonic acid with ordinary oxidizing agents such as hydrogen peroxide. Water solubility: 7.7 gms/100 gms water at 25.5°C. Suggested uses: General anti-oxidant; to improve film properties of cured polysiloxane resins; intermediate for forming metallic salts; accelerator for organic peroxide catalysts.

BENZENE PHOSPHONIC ACID (Phenylphosphonic Acid)



Mol. Wt. 158. Specific gravity 1.475 (4°C.). Melting point 158°C. Strong dibasic acid; colorless crystals. Acid strength: $\text{pK}_1 = 1.85$; $\text{pK}_2 = 7.2$. Soluble in water, alcohol, ether, and acetone. Insoluble in benzene, hexane, and carbon tet. Stable in air. Decomposes at 275°C. with formation of benzene. Water solubility: 40.3 gms/100 gms water at 25.5°C. Suggested uses: Solid acid; intermediate for forming metallic salts used as anti-fouling agents for paints; catalyst for urea formaldehyde and related resins.

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OPINION

Change the Source

TO THE EDITOR: In going over your Sept. 25 issue with my usual avidity, I noticed in your "New Chemicals for Industry" report that "Hexalin" cyclohexanol is listed as being commercially available from Dow Chemical Co. Actually, this is a product of our Polychemicals Dept.—as you probably have heard more than once by now.

With a job that size, I am not surprised that you got caught with a typo—but I hope you throw the cyclohexanol business our way next time . . .

EPES W. SARGENT
E. I. du Pont de Nemours & Co., Inc.
Wilmington, Del.

Consumers Beware

TO THE EDITOR: . . . You have done some outstanding and remarkably thorough reporting on developments in the aerosol business during the past year or so . . . and I was particularly impressed by your recent recounting of the work being done on glass-packaging aerosols ("Glamorizing with Glass," Sept. 18) . . .

But, with a facetious facet to my mind, whenever the word aerosol comes up I can't help thinking of a startling new aerosol product that one of my friends is thinking of inventing. It's a negative-pressure aerosol: When you press the button it sucks in the consumer . . .

W. R. BLACKSTON
Scarsdale, N.Y.

Doubts Salaries

TO THE EDITOR: I've been reading in your magazine, and others, about the lack of technical men and the high salaries these technical men command. If this be true, I must be living in an area teeming with technical experts.

Being a chemist myself I know that starting salaries are from \$50 to \$100 a month less than those quoted by your magazine.

Another bone of contention is the purported lack of executives. I believe one reason for this situation is the fact that many executives hold two or more of the top-level positions in the same company or different companies. I believe this stagnates advancement.

Why don't these old-timers kick loose and appoint younger, less experienced, men to their jobs? Agreed, he will make mistakes but that's the way you learn and gain experience.

Mistakes are costly at that level, you say. True, but one man doesn't usually run the company by himself.

If more executives would realize that they aren't permanent fixtures, I believe they would clear up this situation by themselves.

Please withhold my name.

NAME WITHHELD

Our field editors and regional news bureaus vouch for the accuracy of the salary figures we've given.—ED.

Japanese Exports

TO THE EDITOR: . . . That was a fascinating story that you published on the Japanese chemical industry's drive for exports . . . (Oct. 2, p. 26) . . .

However, I noticed that one picture was perhaps rather vaguely described . . . It shows a dinner party, and includes several young women who aren't identified.

Are they geisha girls? Were you too prudish to say so? . . .

RALPH D. TURNER
Washington, D.C.

(1) Yes. (2) Yes.—ED.

Skirt the Saccharin

TO THE EDITOR: . . . I have been very interested in the reports you have written on the various community relations and stockholder relations projects that have been instituted by chemical companies . . . It seems evident to me that chemical corporations, particularly, are becoming very, very conscious of their citizen responsibilities—as it were . . .

That's good . . . and that corporate character is being noticed is evident . . . Sometimes, though, in my opinion, perhaps this sort of thing has been overdone . . . and may backfire . . .

That's why I thought you might be interested in a comment I read a few days ago concerning a book on business, which had been written by Adolf A. Berle, Jr. . . . The reviewer said that one of his friends had been so impressed by the wonderful literature that turns up with the most modest dividend checks that he has sometimes been so moved by the brochures that he has been on the point of endorsing the checks and returning them to help defray some splendid projects . . .

Such a comment, I will agree, is snide . . . but possibly it mirrors a sentiment of some who regard some stockholder relations as being saccharin-sweet . . .

No company, to my mind, should be ashamed of the good that it does . . . nonetheless, there may be a cautionary note mirrored in the critical remark I cited . . . avoid the completely beneficent attitude, admit that the company does operate to make a profit—that's nothing to be ashamed of—and don't act as if the company is motivated by the precise spirit that motivated Father Damon to work with the lepers . . .

HAYES J. LOWS
Minneapolis, Minn.

DATES AHEAD

Society of Rheology, annual meeting, National Bureau of Standards and Sheraton Park hotel, Washington, D.C., Nov. 3-5.

Air Pollution Control Assn., semiannual technical conference, Biltmore hotel, Los Angeles, Nov. 4-6.

National Paint, Varnish and Lacquer Assn., annual meeting, Palmer House, Chicago, Nov. 15-17.

National Foreign Trade Council, annual convention, Waldorf-Astoria hotel, New York, Nov. 15-17.

Magnesium Assn., annual meeting, Chase hotel, St. Louis, Nov. 15-17.

Industrial Hygiene Foundation, annual meeting, Mellon Institute, Pittsburgh, Nov. 17-18.

Federation of Paint and Varnish Production Clubs, annual meeting, Palmer House, Chicago, Nov. 18-20.

Chemical and Plastic Industries Equipment Salon, Parc des Expositions, Paris, France, Dec. 2-12.

American Pharmaceutical Manufacturers' Assn., combined midyear and Eastern section meeting, Waldorf-Astoria hotel, New York, Dec. 6-8.

Chemical Specialties Manufacturers Assn., annual meeting, New Yorker hotel, New York, Dec. 6-8.

American Institute of Chemical Engineers, annual meeting, Statler hotel, New York, Dec. 12-15.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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...KEEP SUBWAYS CLEAN



ONE PAINT IN A HUNDRED—Toronto's new \$50,000,000 subway is modern in every way, including its glistening tile walls and brightly painted ceilings. For the ceiling, a paint was needed that could resist high humidity. More than 100 were tested and a paint based on Hercules Parlon® (chlorinated rubber) selected. On all types of surfaces, interior and exterior, Parlon paints are providing outstanding service at lower long-term cost.

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NEWSLETTER

Union Carbide took a bold leap out of a tariff tangle by buying Dominion Tar & Chemical's 30-million-lb./year ethylene glycol plant at Montreal East, completed only two years ago.

Dow Chemical of Canada pressed earlier this month, as it did last year, for a Canadian tariff on glycol to exclude imports from the U.S., which have been supplying about a third of Canada's requirements. Now, regardless of the Tariff Board's ultimate decision, Carbide will have Canadian capacity sufficient to supply roughly half of that country's market.

Canadians want additional tariffs, too—and one request started a chain reaction. Canadian Industries Ltd. asked for a 20% duty on polyethylene to protect its production at Edmonton. Then plastic pipe makers asked for an equivalent tariff on plastic pipe since the plastics duty would raise their costs. Then Du Pont of Canada called for protection on plastic film for the same reason. Plax Canada Ltd. asked for an exemption on bottle-grade polyethylene because CIL, it said, doesn't turn out a grade suitable for that purpose.

No decisions yet, but the Tariff Board will make a report.

What will happen to the government-owned magnesium plant at Velasco, Tex., after Oct. 31 is still anybody's guess. Dow, the operator, wants to buy it but the Justice Dept. smells "monopoly" (CW, Oct. 23, p. 16). No arrangements have been made beyond the contract expiration date, and negotiations are at a standstill.

Scandals in government stockpile buying may be in the works. General Services Administration has sent several cases that "indicate fraud" to the Justice Dept. for further investigation and possible indictment.

Cases involve tungsten buying by the Emergency Procurement Service (a GSA bureau)—specifically, purchases of tungsten smuggled into the U.S. from Mexico and other foreign countries, then pawned off as U.S.-produced metal. Under a special incentive program, EPS buys domestic tungsten at more than double the world market price. According to some widespread charges, heavy tonnages of bootlegged tungsten have been illegally sold to EPS.

At the same time, GSA officials say that an "administrative" shake-up is brewing for EPS. But they deny it has any connection with the fraudulent tungsten deals. They say it's part of an over-all "management review" being made of all GSA bureaus.

Some shifts in the lineup of companies participating with the Atomic Energy Commission in nuclear power studies:

- Dow Chemical is dropping out of the Dow-Detroit Edison project (see p. 11).
- Several process industries firms—Fluor, Phillips Petroleum and Minnesota Mining among them—are joining with utility companies

NEWSLETTER

in a new Rocky Mountain Nuclear Power Study Group. Each of the nine firms will put up an initial \$5000 to study the feasibility of a power reactor for western U. S.

Great Britain is also moving ahead in atomic power. T. E. Allibone, director of the central research laboratory of Britain's largest electric power combine, says that within two years Great Britain will produce 100,000 kw. of nuclear-generated electricity. And by 1970, he predicts, nuclear reactors will be producing the power equivalent of 20 million tons/year of coal.

The wheels of legal machinery have ground out several decisions affecting the process industries. Among them:

- An act, signed by President Eisenhower, puts two synthetic drugs under federal narcotics law: 3-methoxy-N-methylmorphinan (except the nonhabit-forming dextrorotatory form) and 4-(3-hydroxyphenyl)-1-methyl-4-piperidyl ethyl ketone (Ketobemidone) and their salts. They're now under the same restrictions as morphine and similar opium derivatives.

- A decision by Federal Judge George Boldt, at Tacoma, Wash., that fluoride-containing gases from Reynolds Metals' plants at Longview, Wash., and Troutdale, Ore., do not constitute an unreasonable interference with dairying in the area. Groups of local farmers had sued for over \$1 million in damages, claiming injury to their farms and livestock. Judge Boldt decided that they had not produced sufficient evidence.

- A decision by the Texas Supreme Court sustaining the court of appeals in holding that the state is entitled to taxes on sulfur derived from "sour" natural gas. Companies had paid \$297,026 under protest, and now the state is free to use the money.

The Western states grab the lion's share of expansion news:

- Kerr-McGee Oil Industries and National Farmers Union have agreed on joint development of NFU's multimillion-dollar potash holdings in New Mexico.

- Chemical Salt Production Co., a Pennsalt-Hooker joint enterprise, is looking to Utah for solution of long-range raw materials problems. Two alternatives are under consideration: purchase from Bonneville, Ltd., of by-product salt from potash refining operations, or construction (for \$2-2.5 million) of salt pans in Great Salt Lake.

- Brea Chemicals will build a multimillion-dollar solid fertilizer plant at Brea, Calif.; initial product will be fertilizer-grade ammonium nitrate. Construction will begin in January.

- Harvey Machine's \$65-million aluminum project at The Dalles, Ore., is still not a "dead duck." The local chamber of commerce is now pushing Bonneville Power Administration for electrical service lines and a firm contact to permit Harvey's go-ahead.

Two new laundry products and a new synthesis:

- Monsanto is test-marketing (in Columbus, O.) NU, a fabric finish that eliminates starching and lasts through 10-15 washings.
- Jergens is introducing (in Dayton, O.) a liquid dishwashing detergent, "instant suds." Copy theme: kind to your hands.
- Eli Lilly researchers have evolved a synthesis of lysergic acid, pharmaceutical intermediate now obtained from a fungus.

... The Editors

BUSINESS & INDUSTRY . . .

Atom Group Split

That chemical industry plans for utilizing atomic energy are becoming more specific is betokened this week in news that a second large chemical company is pulling out of temporary partnership with an electric power concern in a nuclear energy research project.

Last year, Monsanto Chemical and Union Electric Co. of Missouri parted company, Monsanto pursuing its goal of a dual-purpose power-and-plutonium reactor while Union Electric teamed up with three other utility firms and Bechtel Corp. to concentrate on power-first reactor problems.

Last week, Dow Chemical and Detroit Edison confirmed that their three-year alliance is about to be severed. Dow has requested Atomic Energy Commission approval to withdraw from the project and continue independent nuclear research, specializing in utilization of nuclear reactor by-products rather than reactor development. Detroit Edison plans to expand the industrial atomic group and change the name from Dow-Edison & Associates to Atomic Power Development Associates. The expansion will bring nine more companies to the roster, making a total of 34. APDA will carry on its studies looking toward design and eventual construction of an economic commercial power reactor.

Chemical Aspects Stressed: Leland Doan, Dow's president, explained his company's decision by saying studies had reached a stage where participating companies have found their interests have crystallized.

"In our case," Doan said, "we are primarily interested in the chemical aspects of atomic power and the possible utilization of nuclear reactor by-products in the chemical industry. We have gained basic knowledge concerning the technology of nuclear reactors from the project, but from this point on, it is not logical for us to continue participation in a program directed at the development of atomic power as such."

What is now clearly shaping up: utility companies are pursuing reactor-for-power developments; chemical concerns are zeroing in on chemical potentials.



NLRB'S FARMER, BEESON: Over stock purchase dispute, they disagree.

Wages or Gift?

Company stock has been added to the widening list of fair game that labor unions may shoot for at the bargaining table—but this decision by the National Labor Relations Board is being appealed to the federal courts.

It's of immediate concern to the chemical companies that have already been helping their employees buy stock shares; and it may mean that unions can now demand that other chemical companies launch stock purchase plans.

NLRB's decision—regarded as one of the most important in the board's history—came last week in the Richfield Oil Co. case. The company had offered a stock purchase plan to its employees last year on these terms: each employee could have at least \$5 but not more than 5% deducted from each month's pay, and the company would

contribute an amount ranging from 50-75% of the wage deductions, depending on previous year's profits.

The Oil Workers International Union (CIO), contending that its members were getting slightly more generous terms from other employers, asked Richfield to negotiate on this matter, and the company refused. Richfield's arguments:

- What a company does with its own stock is up to management, not to a labor union.
- If a union bargains on stock purchases, it gains a seat on both sides of the bargaining table—as representative of the employees, and as the agent of stockholding members.

Chairman Guy Farmer and NLRB members Ivar Peterson and Philip Ray Rogers rejected the Richfield reasoning, ruled that a stock plan is a form of wages. A minority opinion by newest board member Albert Beeson—formerly with Food Machinery & Chemical Corp.—upheld the company position. Richfield says it will "follow all due processes of law available" in fighting the ruling.

No Default on Dyes

U.S. chemical companies manufacturing coal-tar colors and dyes are virtually unanimous on this point: they won't take chances on losing their shares of the domestic market by default.

At New York City's Plaza hotel last week, representatives of at least 55 of the country's approximately 60 makers of those products agreed to cooperate in the coal-tar product classification system recently announced by the U.S. Customs Bureau (CW, Oct. 9, p. 13). Each company will send to the Customs laboratory in New York a data card and a 2-oz. or 4-oz. sample of each product that comes under the 1930 Tariff Act's paragraph 28. That paragraph requires coal-tar imports to be assessed at the U.S. selling price if they compete with domestic products.

The meeting was chaired by American Cyanamid's John Fasoli, chairman of the customs committee of the Synthetic Organic Chemical Manufacturers Assn. Cooperating were officials of the Customs Bureau and the Dry Color Manufacturers' Assn.



VAN WINCKEL, DUDLEY, AND KITHIL: Now doing a \$1.5-million plus business.

Getting Set to Diversify

Some 10 miles inland from the coast of New England and just north of New Haven a relatively small chemical company is stepping spryly along the product diversification path. The Carwin Co.—now doing \$1.5-\$2 million a year in dyestuff intermediates—has decided to spread out so that its corporate future won't be tied solely to the vacillating textile industry. It's a significant step for Carwin, which, ever since it was formed back in 1932, has quietly built its business on a comparatively few chemicals. (Incidentally, it sells them to a comparatively few customers—the 75 or so U.S. makers of dyestuffs. Currently it turns out 120,000-130,000 lbs. of in-

termediates a month. Dichlorobenzidine, benzidine, and dianisidine are the major products; ortho- and metatolidine, anthranilic acid and quinizarin essentially make up the balance.

Now, although the company has no intention of sidetracking its basic "bread and butter" items, it's bent on diversifying. And as Carl Van Winckel, who heads the company's youthful management team put it: "There are, of course, always two possible routes to diversification: (1) by simple expansion—which can be costly; (2) by exploiting the facilities you have to develop new products. The latter course, when a company has

limited financial resources, is the logical choice—and ours."

The Carwin drive to diversify currently pivots on these three projects:

- Development of several unique processes (which, if commercialized, would broaden the product line).
- Capitalizing on know-how acquired in the fabrication of some of its own special equipment. (Possibly: the company may launch a custom-made equipment division.)
- Development of new monomers and kindred plastics raw materials.

It's specialty products, and special abilities, Van Winckel readily admits, that Carwin will strive to capitalize on. For, as he says quite candidly, "We



NEW HAVEN SITE has many advantages—settling ponds, nearby salt water, ready transportation.

aren't deluding ourselves by thinking that we are in a position to compete with the giant chemical concerns. We'll venture into new fields—such as raw materials for elastomers—but only with items that our big brothers won't (because of the relatively small volume involved) bother to turn out.*

That's part of the thinking behind the two diisocyanate compounds, which Carwin is already producing in semicommercial quantities: both of them (bitolylene diisocyanate and dianisidine diisocyanate) are regarded by Vice-President Jim Dudley as prime nominees to displace some presently used elastomer bases. The potential market he envisions, in surface coatings, adhesives, for example, could run to several million pounds/year. But that potential isn't nailed down yet; Carwin is still sizing up the outlook—mainly via cooperative research with resin makers.*

In one respect, at least, if Carwin decides to expand its plant facilities, it will face no problem. "There's plenty of room here," says Vice-President Dick Kithil, "to grow. We've got acreage that includes two stream-fed ponds—originally brickyard clay pits that now supply process and cooling water for plant operations.

Geographically, too, the company is pleasantly located: close to a railroad (New Haven), trucking routes and Connecticut parkways and to both raw materials and customers.

The move to the North Haven site (from Linden, N.J.) was made a half-dozen years ago when company officials had growth in mind. And growth plans are bubbling in their minds again today.

Ballots and a Burial

At the polls and in city halls around the country, the battle rolls on: to fluoridate the city water supply or not, that's the question.

In Birmingham, Ala., voters will have their say on this question in next Tuesday's general election. Fluoridation was placed on the ballot after 5000 qualified voters had petitioned for its inclusion. A running debate over fluoridation has been waged in public meetings and in publications for the past two years.

At Chicago, where the city council decided last June to start fluoridation next January, the bill for carrying out this plan has been buried in the subcommittee on finance.

* Following the same policy it has as a dyestuff intermediate maker (Carwin made no dyes), it also plans to sell resin raw materials only, make no resins itself.

Drive Against Discounts

Among people who sell drugs, cosmetics and pharmaceuticals directly to the consumers, it's "fair trade" all the way.

Going out this week to congressmen, state legislators, and manufacturers of those items are appeals from the National Assn. of Retail Druggists for preservation and strengthening of fair-trade codes in law and in practice. In addition, NARD members are being urged to help put more zeal into enforcement of existing laws by filing lawsuits themselves if the manufacturers fail to ask for injunctions against "discount house" drug stores.

This was a central theme of the association's 56th annual convention last week in Houston, Tex., at which some



VICTOR M. HELM, HOUSTON
HOT SPRINGS' EISELE: In his organization, 'fair trade's' firmest support.

5000 attendees from all of the 48 states elected G. M. (Bike) Eisele of Hot Springs, Ark., to succeed Marion Hardesty of Louisville, Ky. Speakers included John Toohy, vice-president of Olin Mathieson Chemical Corp. and general manager of its E. R. Squibb subsidiary; Commissioner George Lerrick of the U.S. Food & Drug Administration; and Representatives Wright Patman, Sam Rayburn and Carl Durham.

Price Props Asked: It was clear that pricing is of primary concern to today's druggists. Conventioneers gathered in Sam Houston Coliseum showed that by:

- Applauding the address by Maurice Mermey, director of the Bureau of Education on Fair Trade, who attacked "the ancient and dishonorable

art of price-chiseling," warned that fair trade soon may be facing "its gravest emergency since 1951 when the U.S. Supreme Court temporarily destroyed the effectiveness of the Miller-Tydings Act on a technicality."

- Endorsing the Kefauver-Patman "equality of opportunity bill" to be introduced in Congress next winter to strengthen the Robinson-Patman anti-price discrimination act.

- Adopting a resolution urging manufacturers of drug store products "to re-examine their price structures with the view to increasing the gross profit the retailer receives."

Trading Stamps Assailed: Calling on druggists to take a more aggressive role in enforcement of fair trade laws, NARD General Counsel Herman Waller declared that a principal target should be retailers who give trading stamps whenever a customer buys some fair-traded item. Use of such stamps, he avers, "is more damnable than price-cutting," and is prohibited in at least 24 states.

Mermey predicted that the U.S. Attorney General's committee to study antitrust laws may include in its report an attack on fair trade that "might conceivably touch off setbacks to fair trade in state legislatures and state courts, and might lead to a Congressional struggle over the preservation of the McGuire Act." He said it appears that the committee's majority is approaching the subject of fair trade from the standpoint of textbook economics that advocates the *laissez-faire* doctrine of free and unbridled competition. If America wants to preserve its small business economy, he concluded, it must support rules of fair competition in the marketplace.

Political action was prescribed by NARD Executive Secretary John Darvegal. Foreseeing that "next year we may be compelled to fight as never before to save fair trade," he recommended that members work and vote for the election of fair-trade proponents in next week's state and Congressional elections.

Markups Wanted: The resolution asking for increased markups on drugs and other products was based on premises that the cost of operating a retail drug store has been steadily increasing and that the gross markup on a large percentage of medications "is inadequate to maintain a proper pharmaceutical service to the public."

Among other resolutions adopted during the three-day convention:

- Commending "a few pharmaceu-

BUSINESS & INDUSTRY . . .

tical manufacturers who have established a marketing policy that provides more adequate compensation to the retailer.

• Opposing the alleged campaign by the Proprietary Assn. of America "to bring about the indiscriminate sale of drugs and medicines in nondrug outlets and by unqualified persons by weakening and nullifying the pharmacy laws and regulations of the various states."

• Requesting negotiations on the practice of adding shipping charges to bills for drug store products, especially cosmetics.

• Lauding those manufacturers of pharmaceuticals who have been giving one free package of each new product to every retail pharmacy at the same time the new product is being explained to physicians.

EXPANSION . . .

Potash: Freeport Sulphur Co. (New York) and Pittsburgh Consolidated Coal Co. (Pittsburgh) are negotiating terms of a \$16-million potash project in Carlsbad, N.M. The proposed plant would produce 240,000 tons/year of potassium oxide and commercial potash, would take some two years to build and get into operation.

Sulphur: Venezuelan Sulphur Corp. of America—a company owned by U.S. interests—is readying plans to develop new sulfur deposits in eastern Venezuela. Located 20 miles from the seaport of Carupano, surface deposits are said to average 38% elementary sulfur.

Paper: Hudson Pulp Paper Corp. (New York) plans to expand its Palatka, Fla., plant at a cost of \$15 million. The expansion, scheduled for completion sometime in 1956, will bring the plant's total value up to \$40 million.

Viscose Rayon: Courtaulds-Alabama, Inc. has let the contract for expansion of its viscose rayon facilities at LeMoyne, Ala. The Courtaulds plant, a subsidiary of Courtaulds, Ltd. of England, began operations in 1953 with a capacity of 50 million lbs./year of viscose rayon. Capacity will now be increased to 100 million lbs.—with completion scheduled for next spring.

Ammonia: Ketona Chemical Corp.—the company jointly owned by Alabama By-Products Corp. (Birmingham, Ala.) and Hercules Powder Co. (Wilmington)—has let the contract for engineering and construction work on its proposed anhydrous ammonia

plant at Ketona, Ala. Capacity: 45,000 tons of anhydrous ammonia annually—with operation scheduled for late 1955.

Carbon Dioxide: The Liquid Carbonic Corp. will build a \$1.5-million plant at Oakland, Calif. Construction work will start immediately; and the plant is expected to be in operation by mid-summer 1955.

Foam Rubber: B. F. Goodrich Co., Akron, plans to spend another \$3.5 million to double its foam rubber production capacity at Shelton, Conn. The Shelton plant, recently acquired from Sponge Rubber Products Co., will have its new units ready for production by December 1955.

COMPANIES . . .

National Alfalfa Dehydrating & Milling Co. and National Chlorophyll & Chemical Co. have jointly acquired the research facilities, assets and corporate entity of Cerophyl Laboratories,

Inc. (Kansas City, Kan.) from the Quaker Oats Co. for an undisclosed sum plus a royalty arrangement.

This move marks the third step in National Alfalfa's current expansion program—all directed at gaining a firmer foothold in chemical production.

The Plastics and Engineering Corp. has been incorporated in Huntsville, Ala., with capital of \$100,000.

Directors of Foote Mineral have declared a 3-for-1 split of presently outstanding common stock. Their action is subject to stockholder approval of an increase in the authorized number of common shares—from 1 million to 2.5 million.

Bowaters Southern Paper Corp.'s \$60-million newsprint plant at Calhoun, Tenn., has been dedicated. It has a capacity of 130,000 tons of newsprint and 55,000 tons of kraft pulp annually. "And plans are already being made," company officials state, "to double capacity in the not-too-distant future."



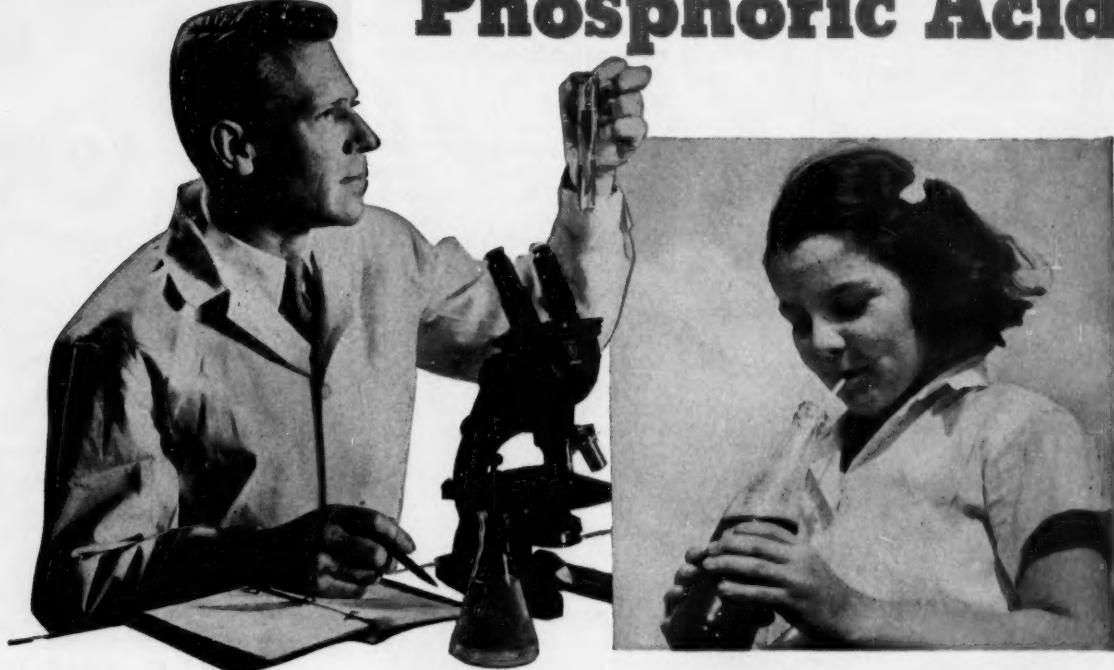
Smog and Politics

NOT ONLY these bantering members of the Highland Park Optimist Club were wearing gas masks during the recent smog siege at Los Angeles; even city council members donned the grotesque devices to dramatize their displeasure. For more than two weeks, the smog was hemmed in over Los Angeles County by a temperature inversion in the atmosphere and by the mountainous walls of the Coastal Range.

The situation looms as a big factor in the California gubernatorial election next week. Criticized by his opponent for having opposed legislation on pollution last winter, Governor Goodwin Knight is proposing an allotment of several million dollars for research work on control measures.

Chemical companies have not been blamed, but auto exhaust fumes have.

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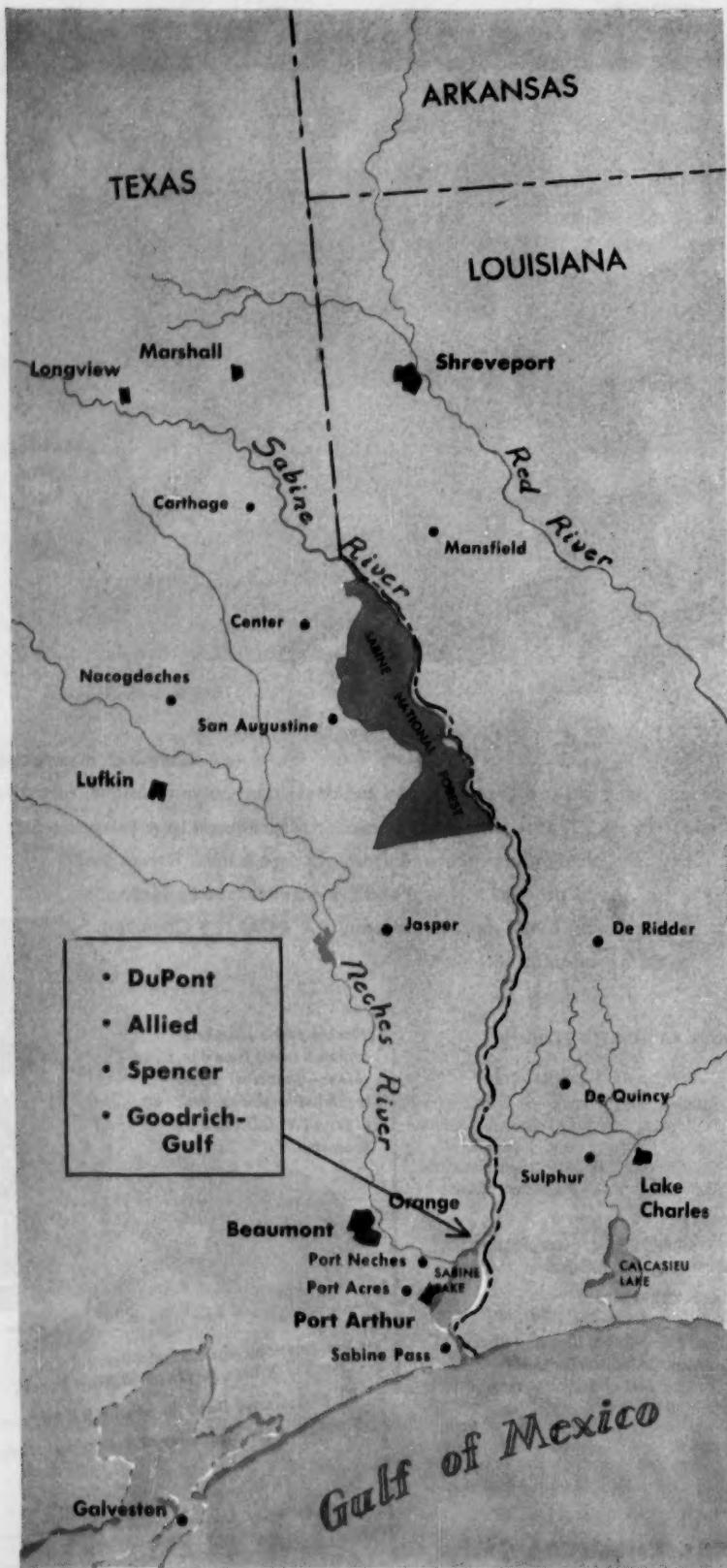
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CHEMICALS AT ORANGE, TEX.: Sites

For Gulf Plants,

Two Gulf Coast states are cosponsoring a water supply program aimed at assuring a stable source of good-quality water for present and future demands by cities and industries—and it's being predicted that this will practically guarantee an increase in the number of chemical and petrochemical plants in the area.

Following approval of the Sabine River Compact between Texas and Louisiana by both states' legislatures and the federal Congress, the two states have set up a five-man commission that has been drafting plans for development of the 600-mile stream. This week, the commission is working on plans for a 6.8-million acre-foot storage reservoir at Toledo Bend, about 150 miles upstream from the chemical community near Orange, Tex. (CW, May 30, '53, p. 18). This will be a bi-state project, financed by the states and located at the point beyond which the river water is shared by the two states.

To help finance its water conservation program, the commission is considering the sale of water to com-

◀ SABINE RIVER AND VICINITY: For salt-



for Du Pont, Allied, Goodrich-Gulf, Spencer

Bi-state Bounty

munities and industries outside the Sabine watershed. It's conceivable that within a few years, surplus Sabine water might be going to points as far west as Houston, as far east as Baton Rouge.

Importance of the water supply problem in this area can be seen in the fact that both states have been working for five years on the agreement that became official on Aug. 10 when President Eisenhower signed the bill.

Rapid industrialization and population growth in Texas have tended to bring about a drop in the level of the ground water table, and all sections of the state have been turning to surface water as the only solution of the fresh-water problem.

In southwest Louisiana, the increase in water consumption during the past few years has created what local observers call a critical problem, and the commission is studying possible methods of getting more ground water into the area. One proposal under discussion: diverting water from the Sabine River, below the Toledo Bend dam.

water port, an assured fresh-water supply.

Farben Reunion?

There's a dispute over the question of whether "recartelization" would be good for Germany, but in some quarters it's felt that the head and limbs and torso of the old I. G. Farben chemical trust would function much better if they were reunited.

Re-establishment of some kind of "working agreement" among the Farben successor companies is beginning to emerge this week as more than just a theoretical exercise, particularly after the decision at the recent nine-nation London conference to grant sovereignty to the West German federal republic. German newspapers have been particularly outspoken the past two weeks in attacking the Allies' policy of decentralizing German industry; and there's evidence that the people of Germany are still not fully "sold" on the idea that the "competitive system" would work out in their country.

To chemical companies in the U.S. and Canada, the possibility that the Farben companies might team up again could mean greatly increased rivalry in certain fields, possibly the eventual loss of some markets at home and abroad.

Uniting for Strength: It's probable that the old Farben combine won't be reconstituted on the lines of its prewar table of organization. But there are indications that the successor companies may get together in at least three important sectors:

- Research. Industry officials have been contrasting the money invested in research by U.S. chemical concerns and the "punny" amounts spent by German firms. In order to place themselves in what they deem to be a realistic competitive position, it's suggested that the Farben successors—and possibly other German chemical companies—should pool their research efforts.

- Division of labor. Many industry officials feel that the dyestuff spectrum should again be divided among the five companies' various plants on the basis of "who can produce what most inexpensively."

- Sales abroad. There's growing sentiment in Germany today that the successor companies should be allowed to establish a joint foreign sales organization to avoid costly duplications.

None of these plans can legally be put into action before Jan. 1, '56, which is the expiration date for the authority of the U.S., British and French occupation officials to run their decartelization program. After that, reunification will be up to the Germans.

Trend toward teamwork

1904— First "community of interests" agreements:

- Badische Anilin
Farbenfabriken Bayer
Agfa

- Leopold Cassella & Co.
Meister, Lucius & Brüning

1916— Expanded "community of interests" agreement:

- Badische Anilin
Farbenfabriken Bayer
Agfa
- Leopold Cassella & Co.
Hoechster Farbwerke
(formerly Meister,
Lucius & Brüning)
- Chemische Fabrik
Griesheim-Elektron
- Chemische Fabriken
(formerly Weiler-ter
Meer)
- Kalle & Co. A.G.

1925— Merger of eight predecessor companies and subsequent acquisition of other firms:

- I. G. Farbenindustrie
A.G.

1952— Five successor companies formed under Allies' decartelization program:

- Badische Anilin
- Farbenfabriken Bayer
- Farbwerke Hoechst
- Cassella Farbwerke
Mainkur
- Chemische Werke
Huels (in escrow pending settlement of claims)

1956 (?)—Proposed cooperative ventures by the five successor companies:

- Pooling of research efforts
- Assigning product lines to various plants on efficiency basis
- Forming joint company for handling exports

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- ✓ better thru dry
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- ✓ good water resistance
- ✓ excellent flexibility
- ✓ low price
- ✓ commercially available

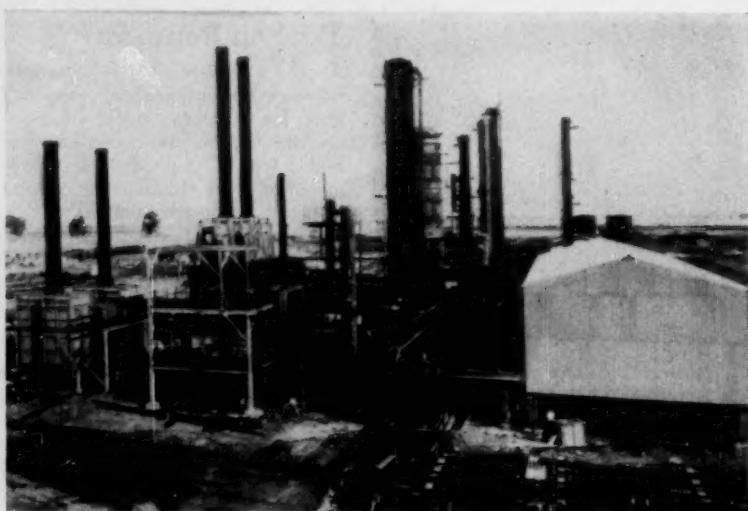
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SASOL'S SYNTHOL PLANT: Will turn out alcohols, acetone, methyl ethyl ketone.

FOREIGN

Hydrocarbons/South Africa: Initial policy of South Africa's state-owned oil-from-coal plant (CW, Oct. 23, p. 24) will be to turn out chemicals that can (1) be produced at a lower cost than imported supplies, and (2) be reprocessed for use by domestic industries. Chemical output due soon includes ethyl, propyl, and butyl alcohol, acetone and methyl ethyl ketone.

Synthetic Detergents/France: Procter & Gamble Co., Cincinnati, has leased the synthetic detergents facilities of Establishments Fournier-Ferrier, Mar-selles, France, for a 30-year period.

Chlorine, Caustic Soda/South Africa: African Explosives and Chemical Industries, a company closely associated with Imperial Chemical Industries, Great Britain, is building a \$5.5-million plant near Durban, South Africa, to produce chlorine and caustic soda. It's expected to be in full production by the end of 1955.

Superphosphates/Manila: Chemical Industries, Manila, is planning to build a \$250,000 plant in the Philippine Islands. Initially, company executives plan to utilize rock phosphate from Pangasian raw material; if local production proves insufficient, the company will import rock from the U.S.

Insecticides/Nicaragua: Industrias Quimico Agricolas, S. A., has just brought a 20-million-lb./year insecticide plant on stream at Managua. Investment: \$1 million. Output, company executives assert, is adequate to supply all of Nicaragua's requirements of insecticides.

Asphalt/Brazil: Petrobras Co., São Paulo will build a Cr\$60-million asphalt plant near the Cubatão Refinery near São Paulo. Capacity: 116,000 tons/year—a quantity sufficient to eliminate importation of asphalt into Brazil and save the country some \$7 million annually.

Cellulose/Norway: Union Paper Mill, Skien, Norway, is planning expansion of cellulose and newsprint facilities at a cost of \$8.5 million. As soon as the state—which owns controlling stock in the company—grants permission, orders will be placed for equipment on "as short delivery terms as possible." The additional facilities are calculated to up Norway's foreign exchange earnings by over \$7 million/year.

Sulfur/Mexico: Pan American Sulphur Co. has just brought two new sulfur wells into operation in Mexico. Yield: 600 tons of sulfur/day. Located at Jaltipan (on the isthmus of Tehuantepec in southern Veracruz) the units cost \$5 million. Port facilities, now under construction at Coatzacoalcos, are being built to handle some 500 tons of sulfur hourly.

Imports/Sweden: The Swedish Ministry of Foreign Trade has freed most chemical products from import licensing requirements from the dollar area. Included: all plastic raw materials. Moreover, the Ministry promises that import licenses for goods not included in the free list will, from now on, be granted more freely. Payment will be made either in the so-called "transit dollars" (placed at the purchasers disposal by a Swedish bank), or paid to a seller country outside the dollar area.



Grace Nitrogen Adds

5

new counties to America's farmland

Opening this fall in Memphis, Tennessee, is a plant which will produce 72,000 tons of nitrogen annually in the form of urea and anhydrous ammonia. That's enough nitrogen to boost America's corn production by more than 50 million bushels — it's like adding three counties of rich farmland to the nation.

Corn is only one example. Actually, there will be many applications for this nitrogen: as fertilizer for other crops, as a protein source for feed supplements, and for industrial uses like the manufacture of plastics, synthetic fibers, and pharmaceuticals, and in petroleum refining.

The Memphis plant's output provides agriculture and industry a *dependable* source, backed by a world of experience.

FOR UREA AND AMMONIA LOOK TO



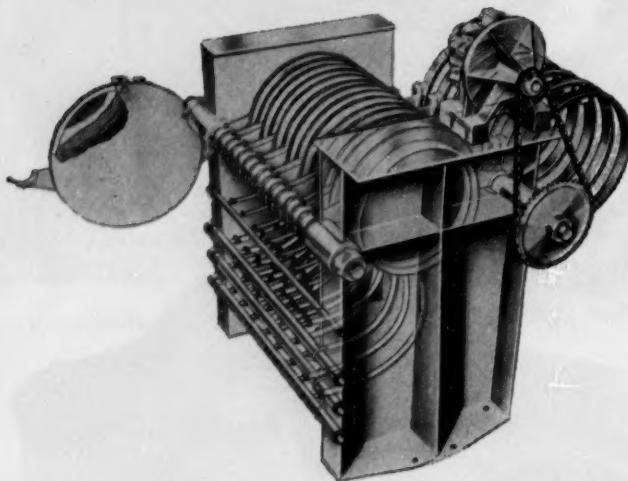
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- Higher washing efficiency, washing free all soluble values with less than one pound of wash water per one pound of feed.

There are many other operating advantages which can be beneficially applied to your filtration work. The Eimco engineer in your territory is available on request to supply full details.

Our Research and Development Center is prepared to run tests and pilot plant determinations on your slurries. They will recommend the best filter for your work either pressure or vacuum, for only Eimco offers a complete line of pressure and vacuum filters.

*Patented and patents pending.



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Salt Lake City, Utah, U.S.A.
Export Office: Eimco Bldg., 52 South St., New York City

You Can't Beat An Eimco!

B & I



SOLICITOR GEN. SOBELOFF: He'll argue for U.S. in cellophane appeal.

L E G A L

Blast or Blaze? It seems that the Texas City Terminal Railway is entitled to collect an insurance award for damages sustained in the 1947 Texas City disaster that started with the explosion of a shipload of fertilizer-grade ammonium nitrate; but the question is, from which insurance companies? The rail company carried fire insurance with six companies and explosion insurance with two other firms. The fire insurance companies contend the damage was caused by the explosion, while the firms holding the explosion policies blame the fires for the damage. The railway has gone into U.S. District Court at Galveston asking for a total of \$3.5 million from whichever insurance companies are held liable. Trial got under way last week.

Competition Definition: Sometime this winter or next spring, U.S. Solicitor General Simon Sobeloff will urge the Supreme Court to reject the way in which the term "competition" was construed by District Judge Paul Leahy in dismissing the cellophane antitrust suit against Du Pont last December at Wilmington. In placing the government's appeal on its calendar for this term, the high court is giving the Justice Dept. and industry a chance to settle on a clear-cut definition of that key word in antitrust proceedings. Justice Dept. lawyers assert that cellophane has been a monopolistic business because Du Pont accounted for up to 75% of total production; but Judge Leahy agreed with Du Pont's attorneys that there was

DAVISON BULLETIN

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FEATHER

SYLOID® 244

Syloid 244 is a highly porous pure silica gel of extremely low density. A free-flowing white powder, it appears as a fluffy snow weighing 4-4.5 pounds per cubic foot as shipped. Syloid 244 has an apparent particle size of 2-3 microns, yet individual particles are predominantly below one micron.

The chemical and physical characteristics of Syloid 244 makes it adaptable for many uses including the following:

- anti-blocking of clear plastic film
- an additive to inks for quick-drying
- a vinyl flattening agent
- anti-caking for powdered products
- thickening agent for salves, lubricants and plastigels

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Division of W. R. Grace & Co.

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Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides. Sole Producers of DAVCO® Granulated Fertilizers.

TYPICAL CHEMICAL AND PHYSICAL CHARACTERISTICS OF SYLOID 244

Color	white, 94 Hunter reflectometer transparent in vehicles
Appearance	uniform, free-flowing powder
Density	
as shipped	4-4.5 lbs./cu. ft.
centrifuged in toluol	7.5 lbs./cu. ft.
true (specific gravity)	2.1-2.2
pH	7.2
Silica as SiO ₂ (dry basis)	99.5%
Oil adsorption	240 lbs. oil/100 lbs. SiO ₂
Surface area (nitrogen)	292 M ₂ /gram

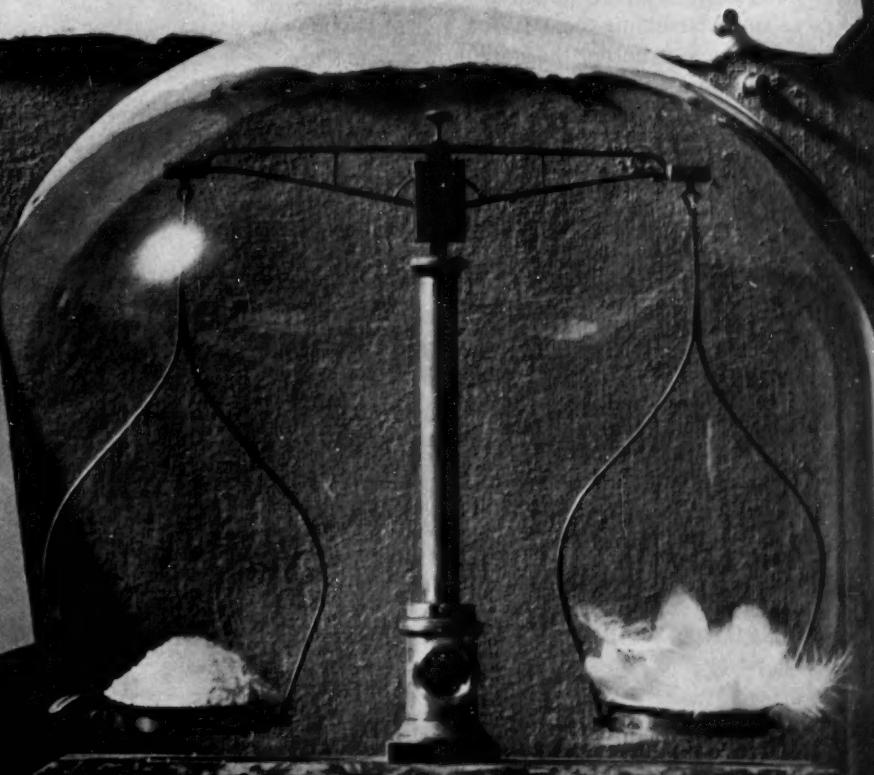
PARTICLE SIZE DISTRIBUTION BY WEIGHT

(water sedimentation)

5% less than 1.1 microns	
10	1.4
20	2.0
40	3.0
50	3.7
60	4.5
80	7.0

Low density
Syloid 244
shown balanced
with feathers.

Write for complete
information, suggested
applications, etc., or
contact your Davison
Field Service Engineer.



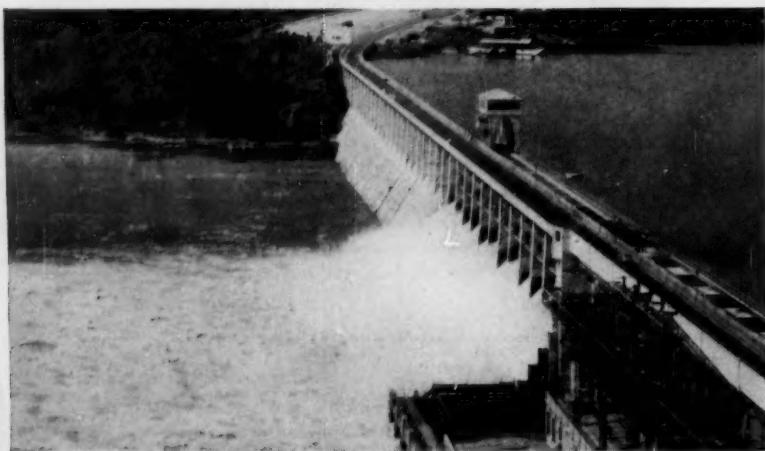
B & I.

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If your business needs more and better water . . . come to Missouri! Here you will find not only ample supply but wide variety . . . soft, very soft, hard, "mineralized," artesian and alluvial waters. "Crystal clear" streams and springs are numerous, offering opportunities for industrial use. Rivers, large and small, including the Missouri and Mississippi, flow through or border the state. Power plants are conveniently placed for commercial service.

Here is a real opportunity for your business . . . and a place for it. Raw materials are readily available. Exceptional transportation facilities bridge the distance between factories and markets. And of special importance, the friendly, cooperative communities of Missouri offer unusual inducements to your industry . . . new, built-to-order plants on attractive, long-term lease, ample supply of skilled, trainable and stable labor, inviting "home town" living conditions.

Many other advantages make a "move to Missouri" worth considering. Why not investigate? Write for literature and special water resources map.



MISSOURI DIVISION OF RESOURCES AND DEVELOPMENT

Dept. J-485

Jefferson City, Missouri

plenty of free competition between cellophane and various other kinds of wrapping materials.

Gas Decision Stays: But the Supreme Court refused to reconsider its June 7 decision that the Federal Power Commission as authority to regulate wholesaling of natural gas by independent producers to interstate pipeline companies. This decision is expected to affect the price and supply of natural gas to chemical plants in various states. Now that it's definite that this decision will stand as far as the courts are concerned, it can be expected that the natural gas industry and the gas-producing states will redouble their efforts to get Congress to change the law on which the high court based its decision.

Tussle for Detroit: Another dispute over natural gas is the fight for the right to supply gas to Detroit. Panhandle Eastern Pipe Line Co. is attacking the FPC's action granting a conditional certificate to American Louisiana Pipe Line Co. for construction of a 5172-mile transmission line from Louisiana to Michigan, and is accusing the American Natural Gas Co. of carrying on a "monopolistic program" in the Detroit area. Panhandle says it has tried to negotiate with American Natural Gas "to provide a more dependable and far less expensive supply of gas to the Michigan and Wisconsin areas than can otherwise be achieved."

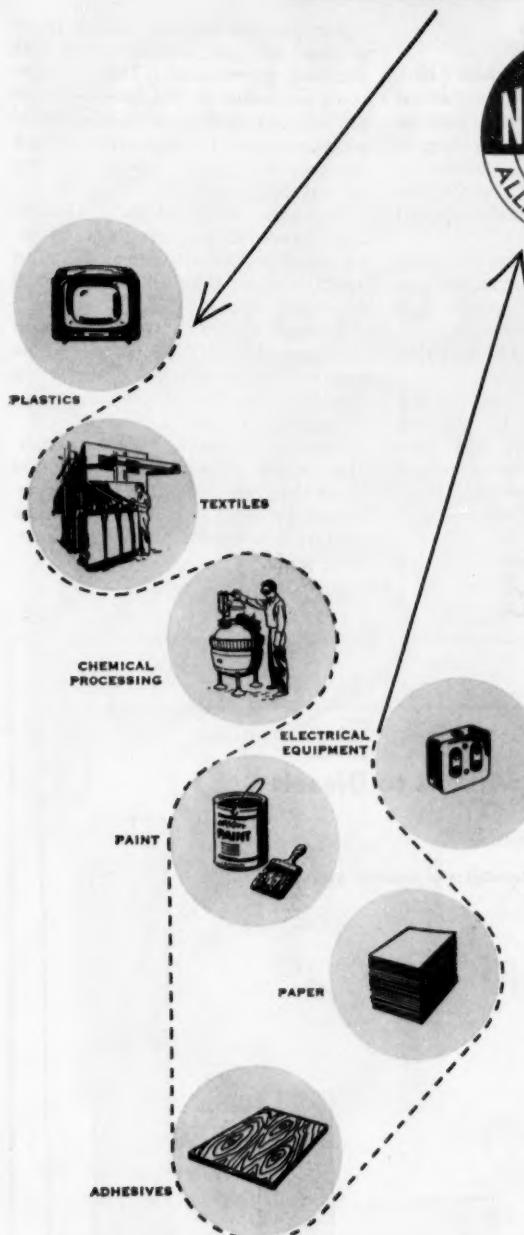
Antitrust Activity: Government lawyers are in the news this week in connection with enforcement of the Sherman, Clayton, and Robinson-Patman Acts:

- Officials of the Justice Dept.'s Antitrust Division are looking over 28 applications for approval of plans for corporate mergers. Sixteen industries are involved. Only chemical process companies included in the list—but not identified—are makers of wood preservatives.

- Before Federal Judge J. Cullen Ganey in U.S. District Court at Philadelphia, the government's long-pending antitrust suit against Sun Oil Co. has come to trial. The government charges that Sun Oil forced some 10,000 independent service station operators to sell only Sun Oil products.

- Shortly after issuing a cease-and-desist order against price-fixing in the fine paper industry, the Federal Trade Commission said it's making progress in determining "rules of the game" on distributors' pricing policies.

UP AND DOWN THE LINE



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With its characteristic high quality, Nitrogen Division Formaldehyde meets the specifications of a wide variety of industrial users.

You always get this high quality because Nitrogen Division, as a basic producer of HCHO, controls its production at every step from natural gas to final products. In fact you know you are getting a top quality product, because Nitrogen Division produces basic Methanol (from which Formaldehyde is made) at the same plant!

Two different concentrations—37% and 45%—are available for your processes—each laboratory checked throughout production and again in tank cars before shipment. Also available is U.F. Concentrate—85, a concentrated formaldehyde-urea solution.

Our central location and convenient shipping points assure you prompt delivery. Call today for specific details of delivery, and ask too about the free technical service offered by Nitrogen Division! Both Formaldehyde and U.F. Concentrate—85 are shipped in 10,000-gallon tank cars and in tank trucks.

U.F. Concentrate—85

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LIQUID FORMALDEHYDE

COMMERCIALLY AVAILABLE

61% Formaldehyde, 24% pure Urea in water solution. Costly excess water has been squeezed out. High costs too have been squeezed out. It increases productive capacity by increasing the effective kettle charge—decreases cycle time. Send for informative product booklet!

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DEPENDABLE OCEAN TRANSPORTATION

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YOUR INQUIRIES WILL BE
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CONFIDENTIALLY



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What's Ahead?

Tagged by the chemical industry here and abroad as the "most ambitious postwar effort to expand trade past the Iron Curtain," last week's meeting of the United Nations' Committee on Development of Trade in Geneva ended on what most observers classed as a "hopeful note."

Of prime interest: representatives of both Eastern and Western European nations have agreed to examine improved payment arrangements, and means of arbitrating commercial disputes.

Especially significant: this is the first time in five years that government officials from Communist and non-Communist countries have matched views—within the framework of a U.N. committee—on the all-important trade problem.

Long-Term Agreements: Russian

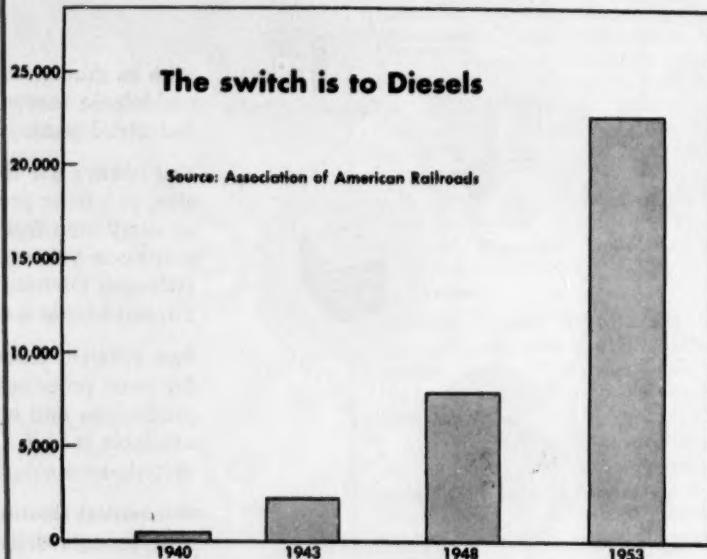
representatives now say they're ready to enter into long-term contracts with Western governments. They're especially interested in purchase contracts for fats and nonferrous metals, would consider export (in exchange) of such items as manganese, manganese ore, oil and equipment.

Rumania, Czechoslovakia, Poland and Greece all submitted lists of exports and imports of particular interest—including a number of chemical products.

British and Americans, for the most part, are skeptical about the whole approach—note that the Communists submitted lists of goods with no indication of price, quality or amount.

Some of the smaller Western countries, on the other hand, are delighted "with the change in atmosphere," interpret the new Communist position as the first step toward uninhibited East-West trade.

IMPACT



Chemical Makers Share the Gain

OF GROWING IMPORTANCE to the chemical industry is the shift from steam to diesel locomotives. Waning is the market for strong alkaline cleaners (that once accounted for more than 1½ million lbs./year of soda ash). But growing are sales of boiler compounds, non-corrosive cleaning agents (that won't harm paint, emulsify quickly, rinse clean), and motor condition-

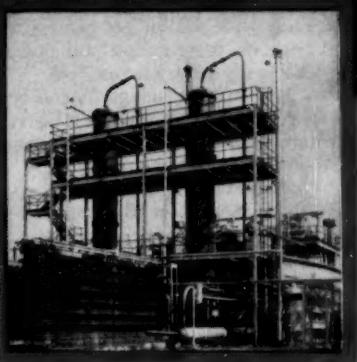
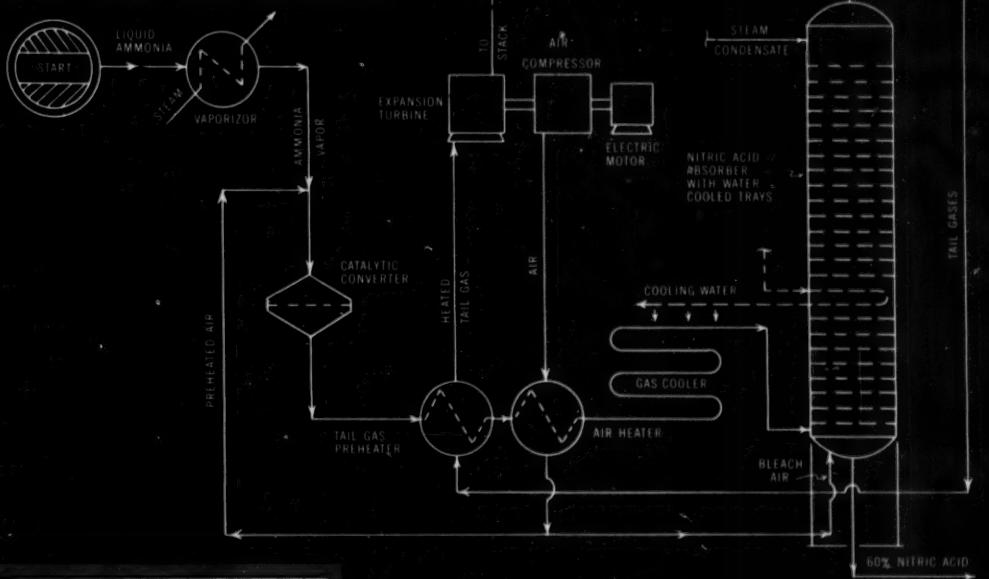
ers (e.g., carbon-removing compounds, chlorinated solvents for electrical systems).

There will be some 26,000 diesels in operation by the end of 1954.

Indicative of the business this involves: one railroad alone estimates it will spend over \$750,000 for chemical products this year—"considerably more in 1955."

NITRIC ACID

FLOW DIAGRAM AMMONIA OXIDATION PROCESS



GIRDLER DESIGNS processes and plants
GIRDLER BUILDS processing plants
GIRDLER MANUFACTURES processing apparatus

GAS PROCESSES DIVISION:

Chemical Processing Plants	Sulphur Plants
Hydrogen Production Plants	Acetylene Plants
Hydrogen Cyanide Plants	Ammonia Plants
Synthesis Gas Plants	Ammonium Nitrate Plants
Carbon Dioxide Plants	Hydrogen Chloride Plants
Gas Purification Plants	Catalysts and Activated Carbon
Plastics Materials Plants	
	Nitric Acid Plants

Nitric acid installation built by Girdler at Mississippi Chemical Corporation's ammonium nitrate plant.

Girdler builds Ammonia Oxidation Plants using Du Pont process

GIRDLER nitric acid plants employ the well-known Du Pont process, using high-pressure catalytic oxidation, to produce nitric acid on a consistent basis. These plants offer greater economy, in both investment and operating costs, than atmospheric or low-pressure units. With the high-pressure process 55% -60% nitric acid is produced with efficient use of catalysts, and with lower utility requirements.

These Girdler plants, incorporating all recent improvements resulting from Du Pont experience, are available in various capacities.

Girdler assumes responsibility for all phases of such process projects: design, engineering, and construction. Write for new booklet giving detailed description of Girdler nitric acid plants.

The GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

LOUISVILLE 1, KENTUCKY

GAS PROCESSES DIVISION: New York, Tulsa, San Francisco. In Canada: Girdler Corporation of Canada Limited, Toronto.

"More Shareholders to Worry About Nowadays . . ."

Registered Stockholders

Company	1943	1948	1953
Air Reduction	16,793	19,841	Pref. 4,515 Com. 18,987
Allied	18,592	20,593	28,600
American Agricultural	5,700 ⁽¹⁾	7,401	8,000
Atlas	4,979	Pref. 1,350 Com. 3,433	4% Pref. 1,233 Com. 4,590
Commercial Solvents	25,461*	23,693	20,171
Davison	Pref. 192 Com. 171	3,600	Pref. 1,306 Com. 2,832
Diamond Alkali	1,555	2,524 ⁽¹⁾	Pref. 674 Com. 3,251
Dow	7,263	14,500	\$4 Cum. Pref. 3,900 Com. 46,100
Du Pont	Pref. 18,766 Com. 71,265	Pref. 23,745 ⁽¹⁾ Com. 79,838	Pref. 22,667 Com. 132,154
Freeport Sulphur	8,816	10,898 ⁽²⁾	12,470
Hercules	Pref. 2,275 Com. 5,517	Pref. 1,983 Com. 7,531	Pref. 1,853 Com. 9,703
Heyden	1,300	Pref. 450 ⁽³⁾ Com. 2,857	Pref. 2,244 Com. 4,943
Hooker	Pref. 266 Com. 1,345	Pref. 1,358 Com. 1,863	Pref. 1,490 Com. 2,525
International Minerals	Pref. 1,075 Com. 3,201	Pref. 1,458 Com. 5,166	Pref. 1,328 Com. 9,486
Mathieson	12,000 (est.)	12,000 (est.)	Pref. 1,800 Com. 29,000
Monsanto	Pref. 3,255 Com. 10,331	Pref. 3,147 Com. 15,186	Pref. C 19 Com. 24,415
Nopco	1,171	Pref. 139 Com. 1,375	Pref. 92 (est.) Com. 2,100 (est.)
Parke, Davis	19,098	23,531	24,226
Pennsalt	2,932	Pref. 1,494 Com. 4,377	6,480
Chas. Pfizer	2,789*	Pref. 18 Com. 7,000	Pref. 1,799 ⁽⁴⁾ Com. 11,849
Texas Gulf Sulphur	33,211*	1,076	38,201
Union Carbide	71,832	84,205	109,551
Victor	2,645*	Pref. 275 Com. 3,092	Pref. 223 Com. 3,467
Virginia Carolina	Pref. 2,300* Com. 5,600	Pref. 2,778 ⁽²⁾ Com. 4,900	Pref. 2,855 Com. 2,836

* As recorded 12/31/44.

(1) As recorded 12/31/49.

(2) As recorded 12/31/47.

(3) As recorded 2/1/42.

(4) As recorded 12/31/52.

No Gesture's Too Trivial

Shareholder relations, long the vexation of harried public relations directors, are getting a full share of attention these days. No stone is being left unturned in a big campaign to make stockholders feel they're part of the company "team;" no detail of annual meetings is too small to warrant full attention, careful planning; no gesture of welcome is too trivial to be overlooked.

"The big reason behind most com-

panies' change of heart," admits one chemical public relations director, "is the simple fact that there are many more shareholders to worry about nowadays." Approximately one out of every 16 adults in the U.S. today owns shares in one or more stock issues; there are outstanding today over 230 million shares of common and preferred stock in chemical companies alone.*

* A Brookings Institute estimated figure.

"By sheer weight of numbers," agrees another, "stockholder opinions have become a major consideration in planning company policy." Whereas the annual meeting was once almost a token affair, today's chemical stockholder meeting is apt to be an elaborate affair, dressed up with carefully staged product displays, graced by the presence of the entire executive staff.

Question of Adaption: "One of the big problems we're facing today," offers one basic chemical producer, "is that the whole character of stockholders has changed in the last several years." More and more share owners each year are coming from the ranks of the medium-sized cities; many more of them are women; an ever-increasing number of them are falling into the 50-59-year age bracket.

That means, necessarily, that responsible stockholder relations men are being forced to recast their techniques—"to talk in the language that the shareholder understands."

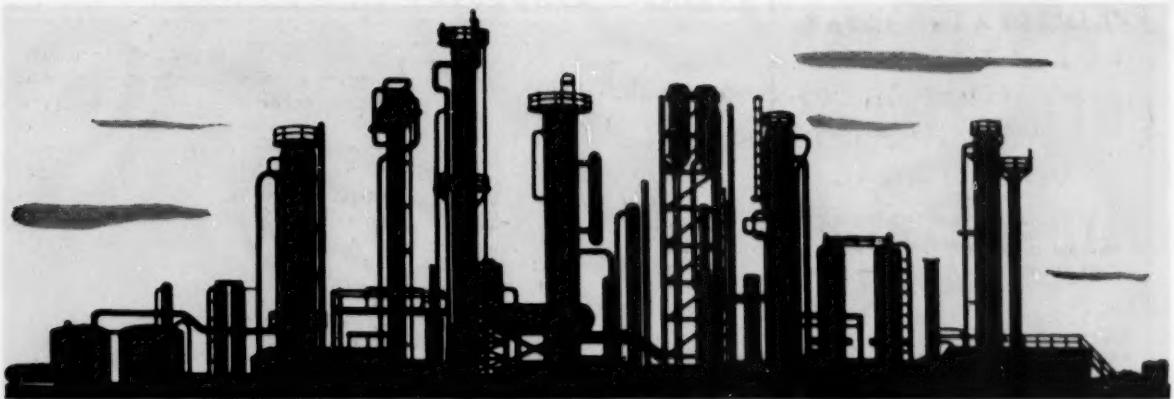
Stockholder literature is changing, too. Annual reports this year, for example, will probably hit an all-time high in eye appeal; numerous chemical companies report they've called in outside aid to "get professional advice on presentation and putting the company's story across."

"It isn't just enough," states one public relations man from the Great Lakes area, "to turn out earnings figures and financial statements alone." Shareholders now expect colorful, pictorial supplements "at frequent intervals." Many companies are preparing company history books, too; others are parceling out product samples at annual meetings.

Widening Interest: "It would be difficult to completely account for the suddenly awakened interest on the part of stockholders in business matters," puzzles one pharmaceutical consultant. "Part of it is simply that there are more of them to be concerned." Du Pont's stockholders, for example, increased 214.0% between 1930 and 1950—47.8% from 1945 to 1950 alone. Union Carbide stockholders multiplied almost as rapidly—174.0% from 1930 to 1950, 30.1% between 1945 and 1950.

But that isn't the sole answer to why chemical stockholders today are attending annual meetings. "The puzzle was solved for me, once and for all," asserts a New York executive, "when I overheard a conversation between two elderly ladies at last year's meeting."

"Isn't it great fun," whispered one to the other, "to spend \$2.5 million in just one afternoon?"



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BUSINESS & INDUSTRY



WIDE WORLD

AFL'S MEANY, CIO'S REUTHER: In their planning, no shotgun wedding.

L A B O R

Union Electioneering: It's an open question how many votes any labor union can "swing," but all three of the major chemical unions are doing their best to drum up the desired political fervor in their respective members for next Tuesday's state and Congressional elections.

• Members of District 50, United Mine Workers, have been given a list of candidates who are called "tried and proved friends" of the workers. The list includes 12 senatorial candidates—all Democrats—and the names of 27 House candidates, of whom six are Republicans.

• Members of the United Gas, Coke & Chemical Workers (CIO) have been exhorted to use their votes to speed the end of "the cold, calculating atmosphere now prevailing in Washington."

• Members of the International Chemical Workers Union (AFL) have been urged to vote for "friends of labor" who will work to preserve and strengthen federal regulations regarded as favorable to labor. Said ICWU's political adviser: "There is a definite, concerted move to invoke upon trade unions and upon the American people this doctrine of states' rights. It is more dangerous than any threat of Communism."

Workers in one chemical process plant ran into legal complications because of their political activities. AFL unionists at one of the Oak Ridge atomic installations have been indicted on grounds that their participation in the Tennessee senatorial campaign

constituted a violation of the Hatch Act, which forbids electioneering on the part of federal employees. Labor unions contend that although the atomic plants are government-owned, the people who work there are employees of the private corporations that operate the plants under contract to the Atomic Energy Commission.

Top-Level Merger: The much talked-about proposal to merge the AFL and CIO has picked up speed but has lost much of its substance in latest negotiations between the two big labor groups. It now appears that a unification move may be made some time next year, but that only the top-level Washington headquarters staffs will be consolidated. There'll be no immediate attempt to force the various rival unions—such as AFL's International Chemical Workers Union and CIO's United Gas, Coke & Chemical Workers—into any "shotgun weddings." Instead, AFL President George Meany and CIO President Walter Reuther—who last week held a joint press conference to report on merger progress—say that their present plans call for "preserving the integrity of each affiliated union."

However, some of those affiliated unions are proceeding with merger plans of their own. The prospective uniting of the two CIO unions that have overlapping jurisdiction in petrochemical plants—Gas-Coke and the Oil Workers International Union—is now tentatively scheduled for next March, when both unions expect to hold special conventions in Cleveland. This had previously been set for No-



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All Esso Petroleum Solvents are made under the most closely controlled modern refining methods. Backed by continuing research and testing, Esso Solvents are famous for their dependable high quality and performance.

6 good reasons why you can depend on Esso Petroleum Solvents

UNIFORMITY — made in modern refineries from carefully selected crude oil sources.

ECONOMY — there's a storage facility near you for low shipping costs and quick delivery.

CONTROLLED EVAPORATION — available in a wide range of evaporation rates with the precise characteristics to meet your needs.

SOLVENCY — Esso aliphatics and Solvesso aromatics cover both high and low solvency ranges.

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B & I. . . and . . .

vember, but had to be postponed so that some smaller Gas-Coke locals could replenish their treasuries before sending delegates to the special convention.

Paint Strike Ends: A warning that the company would invoke its Taft-Hartley right to replace striking employees with nonunion workers brought an end last week to the 16-week strike by Local 260, United Gas, Coke & Chemical Workers (CIO), at the Patterson-Sargent paintmaking plant in Cleveland.

Aims of the strike, according to the union, were a stronger grievance procedure, improved overtime provisions, limitations on the company's power to make transfers, and wage increases. Michael Poyle, president of the local, said the strike also was a protest of company practices that led to 10 arbitration procedures costing the union more than \$2000 in arbitrators' fees.

Company officials view the strike as an attack on the contract's management rights clause, which recognizes management's right to plan, supervise and direct operations of the company and the transfer of employees.

KEY CHANGES. . .

Harold Mazza, to assistant director of research, American Potash & Chemical Corp., Trona, Calif.

Reuel E. Warringer, to vice-president, sales, Climax Molybdenum Co., New York City.

Frank C. Haas, to director, Archer-Daniels-Midland Co., Minneapolis, Minn.

Lammot du Pont Copeland, to vice-president and chairman of the finance committee, **T. Crawley Davis**, to member of the finance committee, and **Robert L. Richards**, to director, vice-president and member of the executive committee, Du Pont Co., Wilmington, Del.

Max A. Minnig, to executive vice-president, Witco Chemical Co., New York.

Thomas C. Dabovich, to general sales manager, Chemical Div., Morton Salt Co., Chicago.

H. H. Wollthan, to vice-president and technical director, **Robert H. Kittner**, to development director, **Edgar E. Hardy**, to research director, and **James D. Mahoney**, to general sales manager, Mobay Chemical Co., St. Louis.

T. Kenneth Haven, to vice-president, Detrex Corp., Detroit.

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you save at
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The segment of a tank head illustrated is typical. Made of 1" thick, Type 302 stainless steel, the head blank measures 210" in diameter and weighs approximately 9900 pounds. So accurately was this segment produced that no "truing up" of the abrasive cut straight edge was required prior to welding two segments together.

It is this unique ability in handling difficult work that makes customers enthusiastic about the G. O. Carlson, Inc. services. For your next job in stainless steel plate . . . let Carlson do it. Your inquiry will receive prompt attention.

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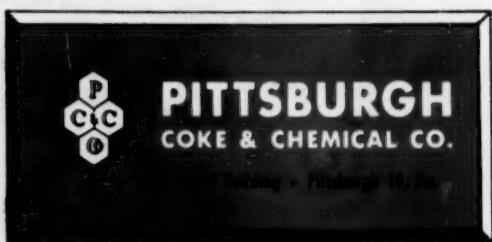
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by Robert Frank

Sulfuric Acid: The Decade Ahead

Sulfuric acid production should reach 18.6 million tons/year by 1965.

To maintain a cushion of safety, capacity will have to be raised to 23.2 million tons/year by that time.

Here's the rundown on what we'll need, where it will come from, 10 years hence:

Just a few weeks ago, a major producer of pigments in Baltimore and a fertilizer manufacturer less than 100 miles away were faced with the same question: whether to meet their anticipated needs for sulfuric acid by buying it or by building a plant. Each

surveyed the situation carefully, then arrived at opposite conclusions: the pigments maker decided to purchase acid, while the fertilizer firm felt it would be better off in the long run if it built a medium-size plant.

But that's the nature of sulfuric acid

supply/demand balances; one city's feast can be a neighboring area's famine. It's also the thing that makes life harried for those who are trying to pinpoint future sulfuric acid requirements. But the bitter scars and poignant memories of the sulfuric acid shortage during the build-up for the Korean War should be enough to convince anyone that long-range planning of sulfuric acid production is essential to the country's economic health.

Look at the Record: Normally, the best way to get an idea of what's going to happen to any commodity is to look at the end use pattern. In the case of



Meet the Author

ROBERT FRANK writes from his vantage point as a chemist and economic consultant.

Educated in Germany (where he got his Ph.D. in inorganic from the Technische Hochschule), he's studied patent law and economics here (at Columbia University). In addition to a broad knowledge of the European chemical industry he's had almost 20 years of scientific experience with the U.S. chemical industry.

After eight years of pure and applied research with American Cyanamid, he moved to Chemical Construction Corp. where he organized and directed the latter's documentation section. There, he was primarily concerned with technical and economic information.

He's now dividing his time between his own consulting business in Old Greenwich, Conn., and economic surveys for Foster D. Snell.

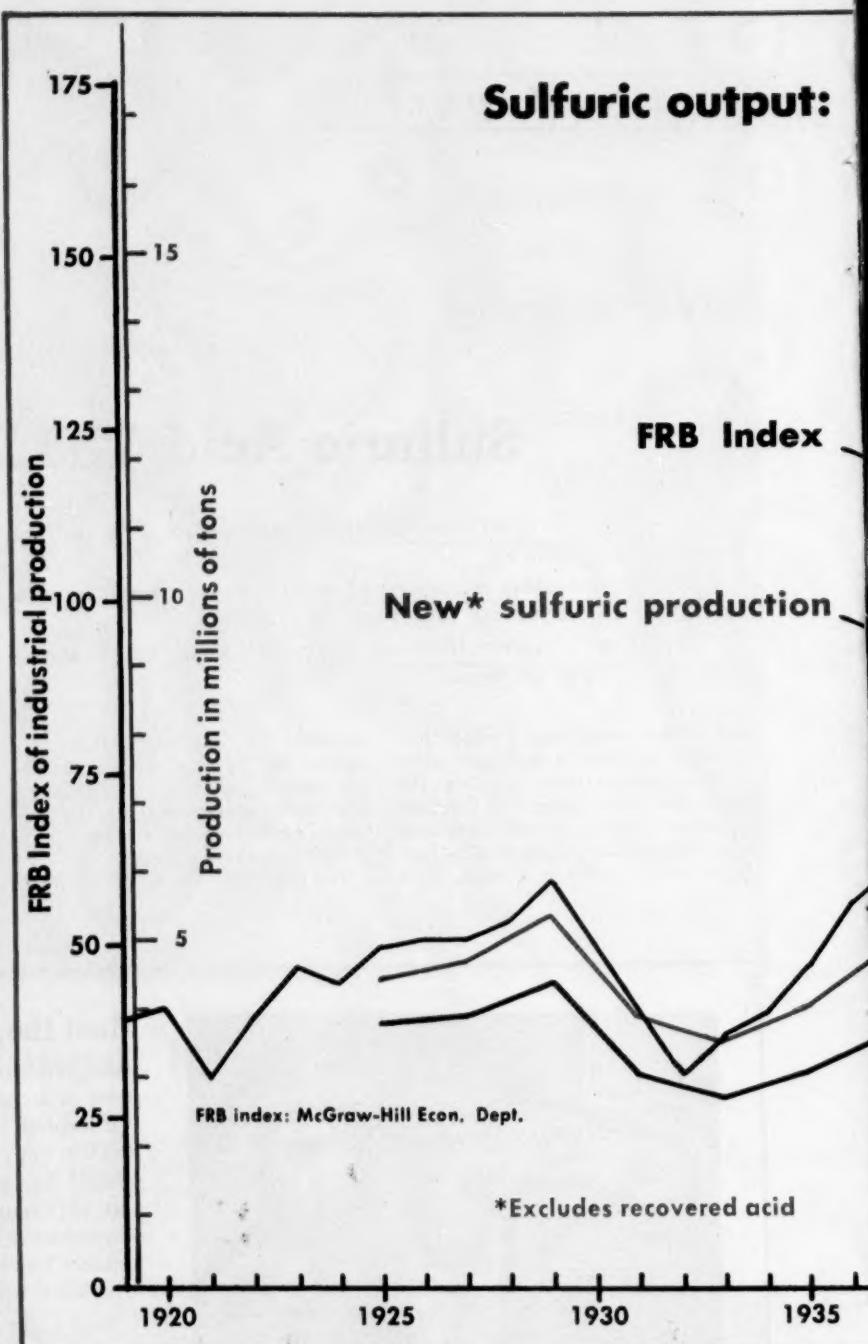
sulfuric acid, the Business & Defense Services Administration has simplified the task somewhat by making a comprehensive breakdown of sulfuric consumption (CW, Feb. 27, p. 84). It shows that the greatest amount, by far, is used in fertilizers; large amounts are also required in petroleum refining, the manufacture of inorganic pigments, pickling steel and in textile processing. Carrying this breakdown a step farther, it's easy to see that sulfuric acid production is tied to the amount of food that's consumed, houses that are built, cars that are made. Sulfuric acid production trends, in short, should be patterned after the increases in population and the standard of living.

The Paley Commission, basing its predictions on projections of population increases, reached the conclusion that by 1975 the nation would require approximately 25 million tons of sulfuric acid annually.

Unfortunately, a projection of sulfuric acid requirements based strictly on population growth can be misleading. Fertilizers afford a good case in point. There's no doubt that more people are going to need more food, therefore a greater amount of fertilizer. But predicting the future needs for sulfuric for fertilizer on the basis of the past fails to take into account the changing patterns in the fertilizer industry.

In 1940, for instance, fertilizer makers consumed 40% of all the sulfuric acid produced. But their percentage take of the total has been perceptibly dwindling. Ammonium sulfate, a popular source of nitrogen for the soil and a heavy consumer of sulfuric, is losing ground to more concentrated fertilizers like liquid ammonia or solid nitrogen forms like urea. Because of the competition of low-cost producers in Europe, moreover, the nitrogen export market is diminishing. In a few short years, ammonium sulfate exports have plummeted from 800,000 tons to 15,000 tons.

The trends in phosphatic fertilizers are even more confusing. Unquestionably they're due for a bigger play. But the growing importance of triple super (at the expense of regular super) should have no net effect on sulfuric



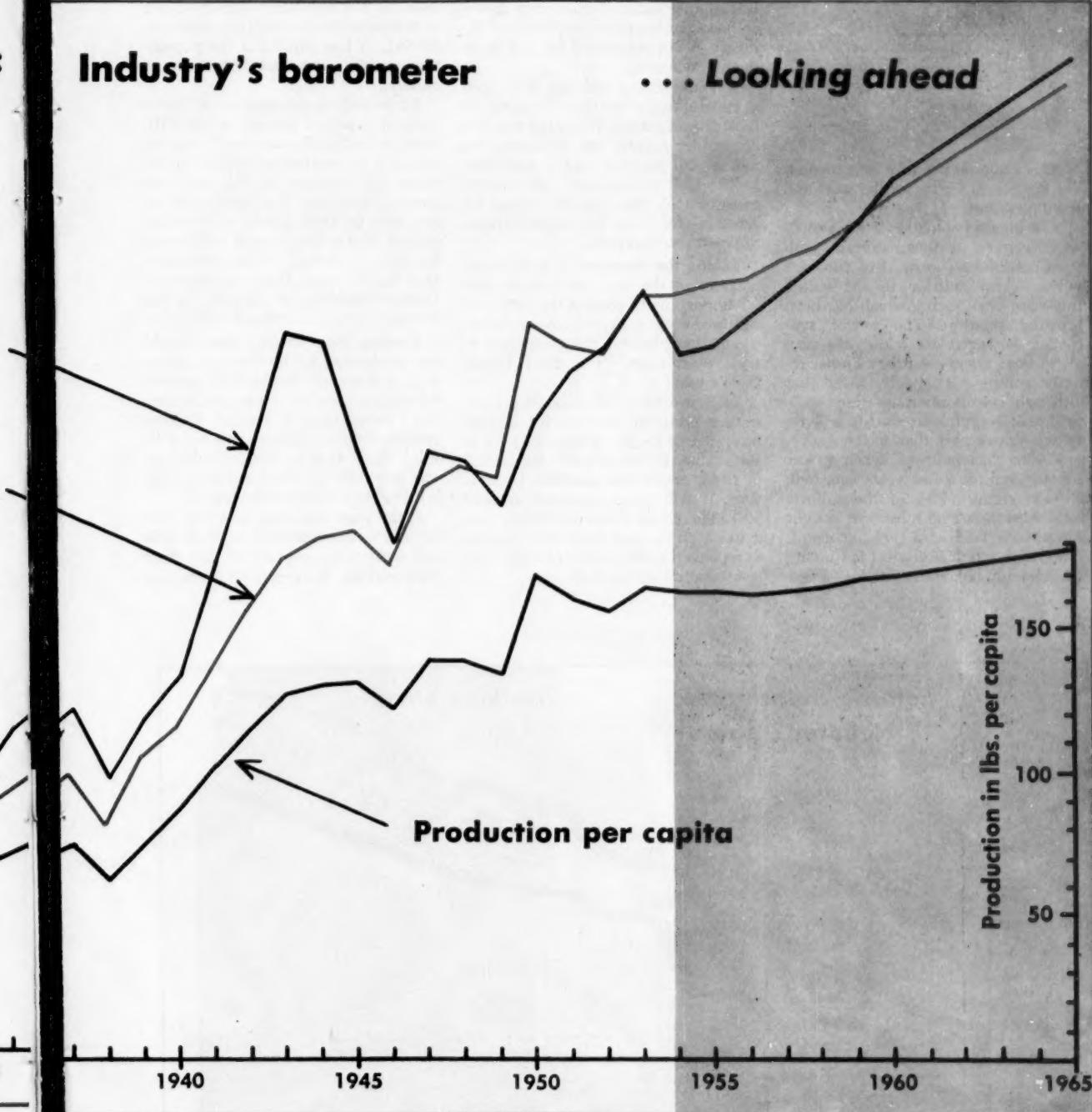
acid, which is needed in making wet-process phosphoric, used in turn to make the more concentrated triple.

But by the same token there's little doubt that other forms of phosphates—like nitro- and thermophosphates—are going to make some inroads on the growth of both regular and triple

super. Because of the sharp shift toward amleness in the supply/demand balance of sulfuric acid over the past two years, the furor over nitrophosphates has now died down. Many firms that were eagerly contemplating ventures in the field lost interest. Two, however, have moved ahead with

Industry's barometer

... Looking ahead



their projects (Allied and Associated Co-op). A full evaluation of the impact of nitrophosphates must await the success those two groups have in selling them to the farmer.

Thermophosphates (made by driving off the fluorine in phosphate rock through fusion in a shaft furnace or

sintering in a kiln) are known here as experimental products only, but have enjoyed some popularity in Europe because of the perennial shortage of sulfur there. And there's evidence that U.S. production of thermophosphates is being given serious consideration.

Further clouding the outlook for

phosphate fertilizers and hence for sulfuric is the possibility of more dicalcium phosphate fertilizer. Made from elemental phosphorus, the dical future is tied largely to the availability and cost of electricity.

Growth Attained: Other factors that forecasts predicated on population in-

creases alone do not take into account are the trends in the textile, steel and refining industries:

• A bigger population will certainly require more textiles; sulfuric consumption should grow. But the best customer for sulfuric in the textile trade has been rayon, which has been growing steadily. The newer synthetics, however, are taking the play away from rayon—and they do not require sulfuric. It's likely, then, that although consumption by the textile field will continue to rise, it will do so at a slower pace than in the past.

• The steel industry, when it was running full tilt a few years ago, took a good chunk (7%) of the sulfuric total. And there's no substitute in sight for sulfuric acid as a pickling agent. But the production of steel is running considerably below the peaks of a few

years ago and it will take some time before it hits those figures again. Unless another national emergency arises, sulfuric consumption in the steel industry is not scheduled for any spectacular increases.

• The refining industry has been a steady customer that promises to have a solid future. When the supplies of petroleum peter out, of course, the nation will have to find a substitute fuel, which may or may not require sulfuric acid. But that day is too far removed for even the most intrepid forecaster to figure on.

Taking the Measure: But the complexities of the task don't mean that it's impossible to predict the future of sulfuric with a degree of accuracy; production planners don't yet have to seek consolation on a ouija board. Here's why:

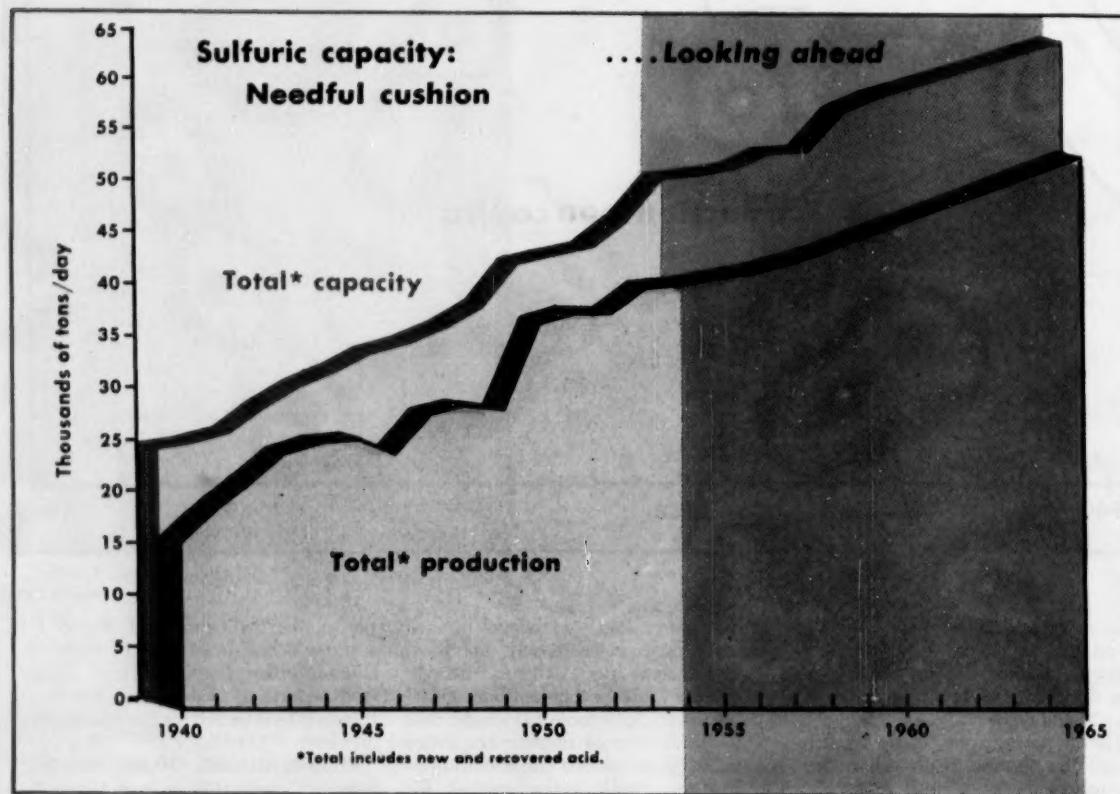
Sulfuric acid has attained its present stature primarily because it's a good buy; at 1 to 2¢/lb., it delivers a lot of acid value. In the 20 years from 1925 to 1945, production doubled. By next year, it will have increased another 50%. There's no reason to believe that it won't go on capturing new markets to replace the older ones, provided the price doesn't go too high.

In the past, sulfuric acid production has shown a remarkable correlation with the Federal Reserve Board index of industrial production (see chart, pp. 34-35). It has paralleled the population growth, too, but not quite so closely.

By projecting the production on the basis of expected growth of the FRB index as well as the increase in population and by making reasonable allowances for changes in the end use pattern, you find that production of new acid by 1960 should be hovering around 16.3 million tons of 100% acid. By 1965, it should hit approximately 18.6 million tons. That will represent another doubling of capacity in the 20 years between 1945 and 1965.

Keeping the Cushion: How should our production facilities shape up for such a demand? Production capacity for sulfuric has always managed to stay just a jump ahead of demand. Figures (which before 1939 are not too reliable) show that in 1940, production was only 65% of actual capacity. This is probably a comfortable margin.

In the years following, however, this cushion was compressed to about 15% and with the exception of the years 1948 and '49, has remained there ever



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since. This is a little too close for comfort, however, and the building program now going on will push it back up to 20%, which is about the minimum margin that can be safely maintained.

Assuming that the production-demand spread will be held at 20%, that means the building program will slow down slightly. The average yearly increase in capacity has been approximately 5%, but for the next five years, it will probably increase at a rate of only about 3%. In the early '60s, it should slow even more.

If, however, the Paley Commission's estimate of 25 million tons needed by 1975 proves to be of the right order of magnitude, and the margin of 20% is maintained, there would likely be

another big spurt in the building of sulfuric plants during the early '70s. For by 1975, the country would need a capacity of 90,000 daily tons, or just about double what it was at the end of last year.

Even after being fortified with the knowledge of how much capacity he'll need by a certain date, however, the sulfuric producer's problems are only half solved (unless production is to be captive). For he still has to know where to build.

Presently, it takes between 18-24 months to put up a sulfur-burning plant. That plus the economic limitations placed on the distance the acid can be shipped means he not only has to start producing at the right time, he's got to find the right place two years in advance. Market studies and forecasts of population shifts are a big help in this respect. Only a few companies, however, have been able to plan ahead with any degree of accuracy.

Sources of Acid: Underpinning the whole structure of sulfuric acid, of course, is the cheapness and availability of Frasch-mined elemental sulfur.

And it looks as though there'll be enough, for at least 10 years, to meet all requirements. Periodically new domes are uncovered and recent discoveries along the Gulf Coast are sufficient to last for many years.

But recovery from these sources is a difficult and costly affair. And when the total sulfuric output starts to approach the tonnage predicted in the Paley Report, other sources of sulfur will have to be considered.

One such potential source of supply is Mexican sulfur. Figures of 1 million tons/year of sulfur production in Mexico have been bruited about freely. But sulfur people here feel that it's years away, wouldn't be too surprised if it didn't materialize at all.

Pyrites, too, represent a potentially important starting material for sulfuric acid. But the initial investment for a pyrites plant is almost twice that for a plant working off elemental sulfur. Even during the sulfur shortage of a few years back, not a single U.S. company built a roaster acid plant using pyrites. Significantly, even General Chemical, a veteran at pyrites roasting, has indicated a switch to ele-

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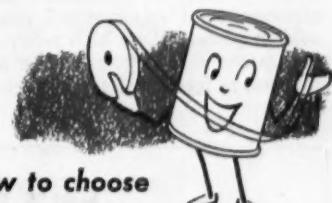
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mental sulfur in its recent moves.

One way to boost the attractiveness of a pyrites plant is being tried out by Norando Mines at its Welland, Ont., plant. There, part of the sulfur value is recovered as elemental sulfur, while the remainder is roasted to sulfur dioxide for use in an adjoining acid plant (*CW*, Jan. 3, '53, p. 31).

Elsewhere, too, attempts are being made to exploit other sulfur sources. At the Yerington plant of Anaconda, for instance, low-grade California sulfur ores are roasted and utilized for sulfuric production. By and large, however, most of the acid plants built since 1950 are based on Frasch sulfur.

Making It Over: One type of sulfuric that certainly seems destined for a bigger role is regenerated acid. Today, approximately 7% of the total supply is made by reconstituting refinery sludge. Some sludge is also hydrolyzed and the acid—after being separated and concentrated—can be sold in places where high concentration is not necessary, as in the manufacture of fertilizers.

An untapped source of regenerated sulfuric is the pickle liquor from steel plants and the effluent from sulfur dioxide pigment plants. Between 40-60% of all the acid used in pickling could be recovered and reused in pickling—if not in pigment manufacture. An incentive to recover acids from these operations is the antipollution campaigns now under way throughout the country.

Keeping Costs Down: It doesn't take any unusual amount of foresight, in fact, to see that in the not-too-distant future, several alternate sources of sulfur will have to be tapped. For, despite the fact that reserves of Frasch-minable sulfur are probably ample for some time to come, there's no doubt that they're heading for depletion. As demand for the acid grows and elemental reserves dwindle, the cost is bound to go up.

Right now, there's not much incentive to utilize other sources. A look at the table (*below*) shows why. It's true that the sulfur dioxide effluent from a zinc roasting operation is a potentially cheap and plentiful source of acid. The investment for such a plant is not out of bounds—although it is higher than for a comparable sulfur-burning plant. And because the sulfur dioxide has to be removed anyway, you can afford to eliminate a raw material charge. In that way, the operating costs are only slightly more than half that for a plant using elemental sulfur.

But there's a limit to the distance

that either the sulfur dioxide or the finished acid can be hauled. And it's simply not practical to plan sulfuric-consuming operations around the nearness to zinc plants.

Operating costs for a plant recovering spent acid from alkylation sludge is similarly attractive. However, the capital investment is considerably higher than that for a plant working on elemental sulfur.

And either investment costs or operating costs argue against any immediate significant trend to any of the other sources of sulfur. Several years ago, for instance, there was some talk of using gypsum (calcium sulfate) to produce acid. But though similar operations have found favor in foreign countries, it's not likely that they will do so here. For the operating costs are considerably higher and the investment cost is approximately three times as high.

All the signs then point to a continued use of Frasch sulfur as the material of choice until the price of sulfuric acid reaches the point where it will be economically attractive to exploit other sources. But if the price gets too high, sulfuric, which built its reputation as a chemical workhorse principally because it's a bargain, will be priced right out of the market. Thus the economic problem is gradually becoming a technological one of finding newer, cheaper ways of getting sulfuric or of getting by-products that can help pay the freight.

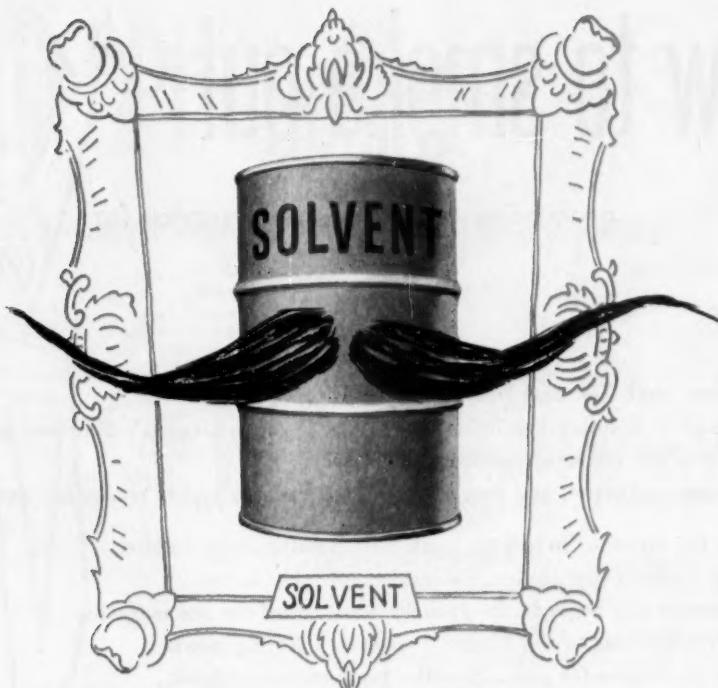
Costs of sulfuric investment and operating costs ... for 100 ton/day plant operating at full capacity

Raw Material Source	Investment Cost	Operating Costs (per ton of 100% acid)			Total
		Raw Material*	Labor, Fuel, etc.	Overhead, Depreciation, Ins., etc.	
Elemental sulfur	\$600,000	\$10.80	\$1.65	\$3.85	\$16.30
Zinc roaster gas	750,000	none	3.20	5.15	8.35
Hydrogen sulfide	800,000	8.30	2.25	5.15	15.70
Pyrites	1,050,000	7.30	5.15	7.15	17.50†
Alkylation spent acid (87%)	1,100,000	none	4.00	7.55	11.55
Refinery sludge (55%)	1,500,000	none	6.40	10.20	16.60

* Elemental sulfur is charged at \$26.50/long ton, f.o.b. mine. Hydrogen sulfide sulfur equivalent is assumed at mine cost, while pyrites is charged at \$23/long ton of sulfur equivalent.

† Assuming credit of \$2.50 for calcine produced per ton of sulfuric.

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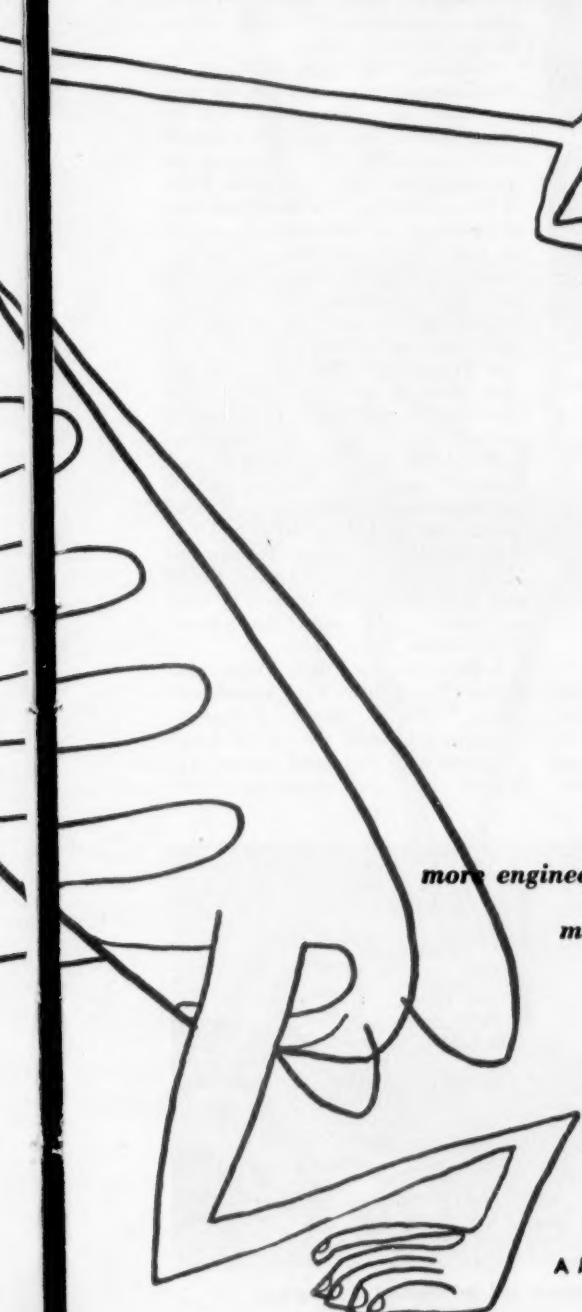
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TANK CARS: Their rates may be spurring a movement to the mountains.

Searchlight on Shipping

While a lot of attention is being given to sales in today's competitive chemical marketplace, other aspects of the distribution function aren't being slighted. Now in full swing, the conference season last week produced evidence indicative of the importance chemical men attach to nonsales operations. The occasion: the Manufacturing Chemists' Assn.'s symposium on transportation, packaging, and labeling of chemicals, at Chicago, Oct. 13.

High transporting costs, poor packaging, and confusing labeling can, as many sales departments have discovered, undo the efforts of the best salesmen, swell the competition's sales figures. It figures then, that the shipping operation is a key in today's scheme of chemical enterprise.

Spotlighting new developments at the Chicago conference were representatives of eight chemical companies, a container manufacturer, and two trade associations.

The bill of fare included the economics of chemical transportation, bulk transportation, precautionary labeling, and small containers. This is what the experts had to say:

- Outlining the "Economics of Chemical Transportation," Donald Ward, Olin Mathieson Chemical Corp., indicated that both transportation and distribution must be evaluated by the transportation department to make

complete use of modern technology at a reasonable (but not necessarily the lowest) cost. Although the chemical process industry has located plants to meet today's conditions, it's doubtful, Ward believes, that these locations will satisfy future long-term requirements.

In choosing a site, transportation is apt to be the long-range controlling factor, and some 20 aspects, ranging from port facilities to carriers' attitude should be considered. Spurred along by high freight rates, a trend to locate

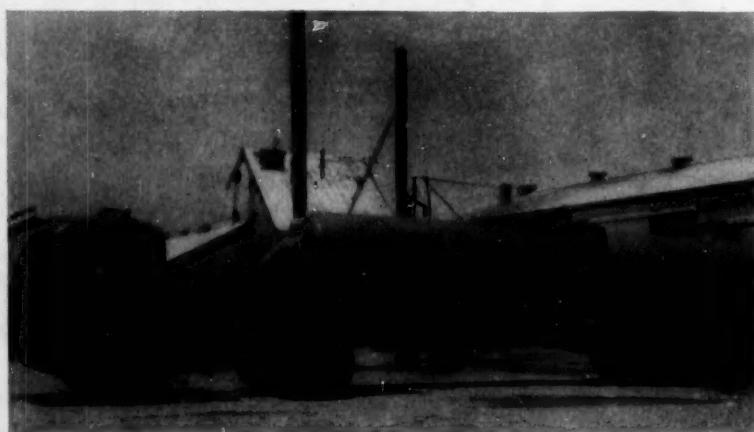
plants in the Mountain Pacific area is developing. Characterized by rigidity and destructive competitive practices, many freight rates are unfair, Ward contended.

- Within recent years, according to T. H. Caldwell, superintendent, Dow Chemical Co., all-fusion-welded types of tank cars have been replacing the riveted variety because of their lower maintenance costs, diminished leak hazards, and a smooth interior surface for application of lining.

Sketching the steps necessary to obtain approval for tank cars for new products, Caldwell suggested that for speedy action, the application should be in good order. And, winding up his discussion on "Tank Cars in the Field of Transportation," Caldwell took note of new tank car specifications desired by federal and industry organizations. New specifications, though not radically changed, are currently being considered by the government and the American Assn. of Railroads.

- Bigger by 400% since 1945, the tank truck industry is believed to be now using about 10% of its 83-million gal. capacity for chemicals. According to Walter Morgan, Union Carbide and Carbon Corp., tank trucking growth has been sparked by elimination of drums, and by bulk pricing, and fast delivery. For the future, Morgan envisions mounting use of hopper trucks and detachable bulk containers such as transit tanks and "Nest-a-Bins" (CW, March 20, p. 64).

- In reviewing "Bulk Transportation of Chemicals by Tank Vessels and Barges," Frank Moore, Columbia-Southern Chemical Co., cited faster towboats with increased power, improved rake and integration, and



TRUCKS: Their trend to hoppers and detachables is mounting.

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INTERNATIONAL MINERALS & CHEMICAL CORPORATION

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and comparisons, pages 30-31-32
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DISTRIBUTION

Story begins on p. 44



SLOWEST, BUT CHEAPEST? Economics will control their movement.

boosted maneuverability in shallow water. Other developments: methane water shipment; 114,000-gal. skin-type barge for sulfuric acid; compartmentalized 233,600-gal. barge for muriatic acid; styrene barges; and regulation revision on sulfuric and muriatic acids, caustic, and anhydrous ammonia.

The extent of the coming switch to water will be governed by economics. Although water movement is the least costly, claims Moore, barges (varying with product) may be dear, and storage at origin and destination points must be considered. Each individual problem must be thoroughly analyzed.

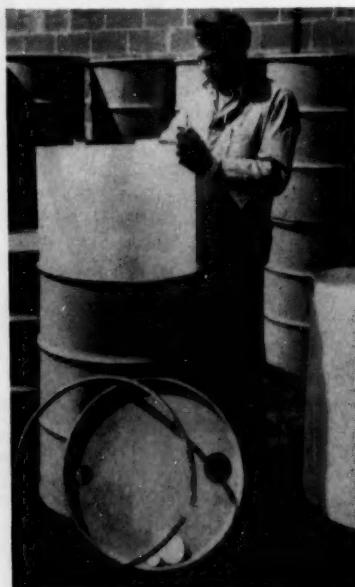
• Precautionary labeling of hazardous chemicals, already well established for industrial chemicals, is in the works for repackaged chemicals. As labeling of materials is beyond the control of the producer once the chemical is sold, state regulators are evolving labeling specifications aimed at eliminating consumer accidents.

The MCA and the International Assn. of Governmental Labor Officials have prepared a model set of regulations, plan to present them to the next meeting of state label regulators. Just this summer, New York adopted warning label requirements.

Education of the public to read warning labels, feels Robert Minteer, Monsanto Chemical Co., constitutes the biggest labeling problem now facing the trade associations and the industry. Cooperation of all will be needed to alert the consumer to the

significance of the warning tag.

• Lighter weight and standardization in drums, cylinders and fittings are in the offing. Touching upon current trends in this field, Robert Long, Harshaw Chemical Corp., mentioned as one example, a new 24-gauge, 55-gal. drum weighing but 27 lbs., yet meeting specifications of an 18-gauge drum. Again reflecting the lighter weight tendency, one drum made of 24-gauge



TOMORROW'S CONTAINERS: Will fiber overpack compete with steel?



Increasing power efficiency lowers chemical production costs

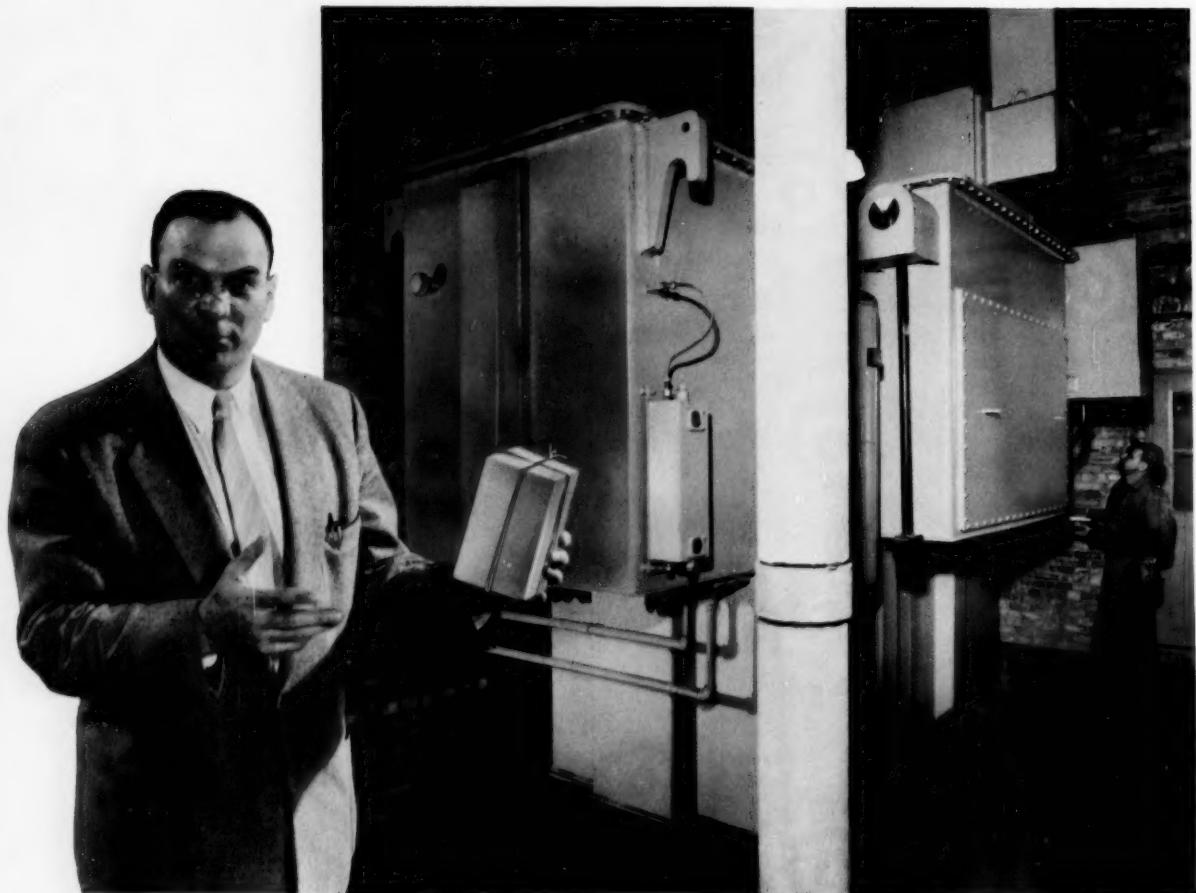
1. CUTS POWER DISTRIBUTION MAINTENANCE
2. IMPROVES POWER FACTOR TO FURNACES
3. EXTENDS FURNACE REACTION ZONES
4. PROVIDES AUTOMATIC FURNACE CONTROL
5. INCREASES POWER RECTIFICATION RELIABILITY
6. REDUCES HAZARDS OF CORROSION
7. REDUCES TOTAL POWER CONSUMPTION

On the next 7 pages, Ira Coen, Manager, Chemical Industry Sales, Westinghouse Electric Corp., shows you how the right combination of electrical equipment cuts production costs.

YOU CAN BE SURE...IF IT'S Westinghouse



Packaged installation resulted in improved power efficiency gain at this plant



Shell-type Westinghouse Furnace Transformer serving phosphorus reduction furnace. Provided high power factor, cut total power costs.

Shell transformer can be installed close to load to improve power factor

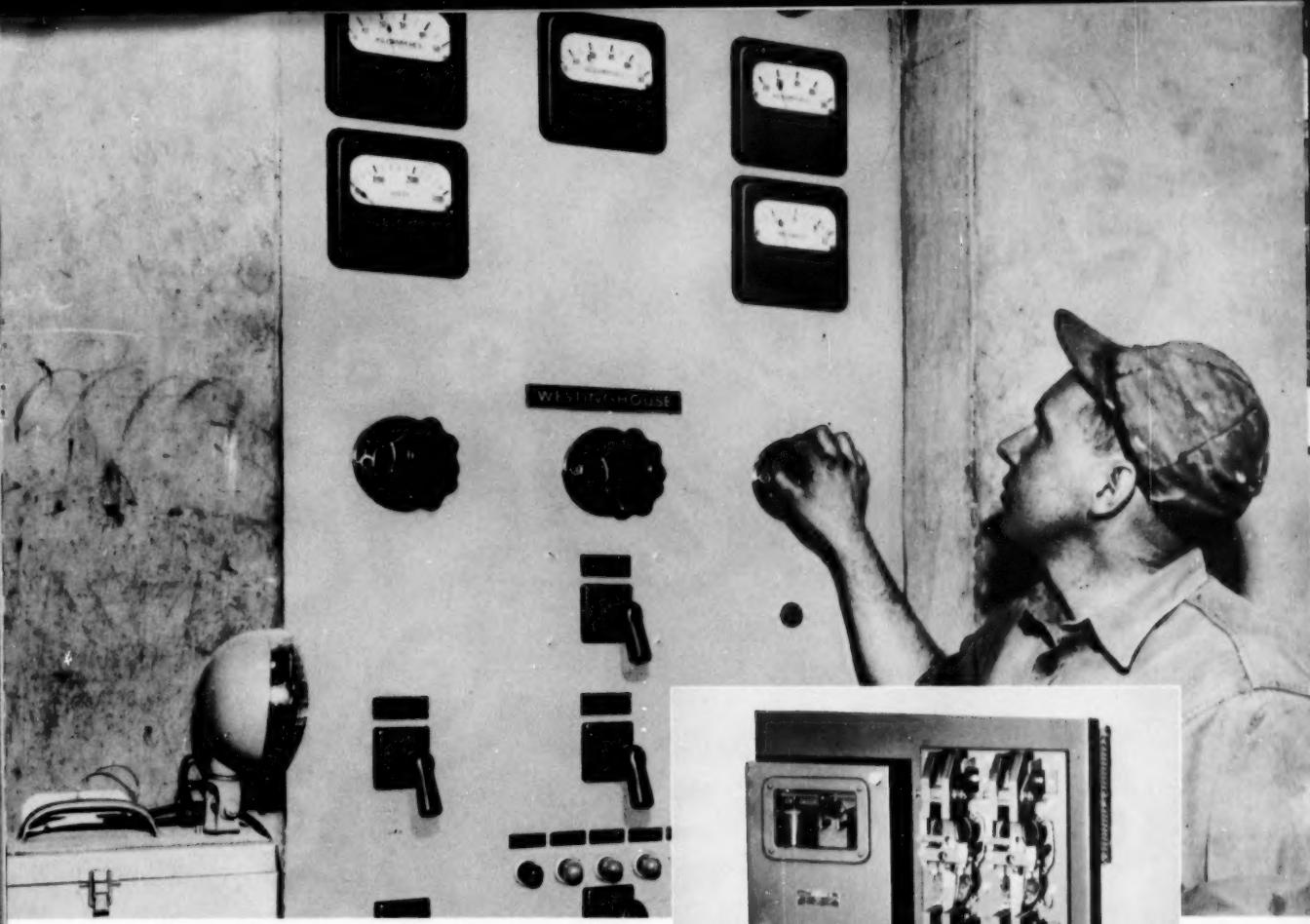
Basic producers — large, medium, or small — can bring power to unit processes more economically and use it more efficiently, for a net increase in production and reduction in power cost.

One company, in cooperation with Westinghouse Engineers, planned an electrical package from power supply to furnace that did just that.

The first important step was to bring furnace transformers as close to utilization points as possible, so that secondary leads were short. Resulting high power factor cut energy costs considerably.

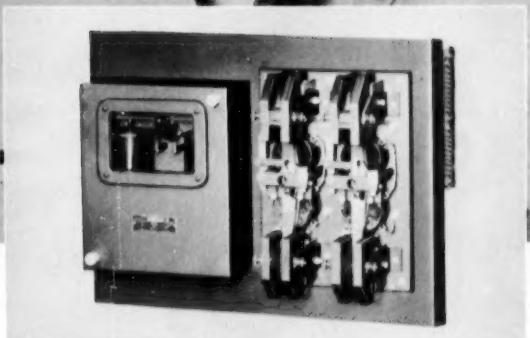
The furnace is operated at high voltage close to the load, providing electrical efficiency approximately 10% higher than usual.

The Westinghouse Shell-type Transformer is basically a far better performer, electrically and mechanically, for applications such as this where electrical equipment must stand the terrific punishment of cyclic loading and high current surges. Westinghouse Shell Transformers are more compact, provide better cooling, are gas and moisture tight. Maintenance is lower.



Operator's panel for arc furnace—current settings are made here.

Type AU Regulator assembly for one electrode; each is comprised of AU Regulator electrode element and reversing contactor.



Westinghouse Type AU Balanced Beam Regulator provides automatic operation and accurate control of energy to furnace

The second major step in this installation was the choice of the Westinghouse AU Regulator as the furnace control system. This regulator balances arc voltage and current to maintain the desired power input set by the operator, consistently and precisely.

If furnace conditions change, position of electrodes within the charge is automatically changed to maintain the current pre-set by the furnace operator. The Type AU Balanced Beam Regulator was the first arc furnace control which measured both arc current and voltage in positioning electrodes and is the only balanced beam type now available.

The Type AU Regulator acts fast to correct cur-

rent unbalance but doesn't overshoot or hunt. The sensitivity can be adjusted to suit particular furnace conditions. Properly applied and adjusted, the Type AU regulator will maintain electrode position to insure maximum continuous protection from chemical arc furnaces. It is particularly adaptable to use with automatic power regulating systems.

Westinghouse Type AU Balanced Beam Regulator is recommended as the most suitable and economical for most chemical arc furnace applications. For the few applications where a rotating regulator is desirable, the Westinghouse Rototrol® is available.

YOU CAN BE **SURE**...IF IT'S **Westinghouse**



One man and dependable Westinghouse Ignitron Rectifiers run this chlorine line

As this basic chemical producer has found, Westinghouse Ignitron Rectifiers bring a new standard of performance—high power conversion efficiency and low cost to electrolytic processes using power in the 250-3000 voltage range. The chlorine gas operation at this plant is comprised of 180 cells, connected in series, at 650 volts, and is served by a bank of 48 rectifier units.

The Ignitron Rectifier, developed by Westinghouse, introduces a basically new principle in the utilization of rectifying properties of the mercury vapor arc. At higher voltages, it is undisputedly more efficient than motor-generator sets or rotary converters. Production cost savings are proportion-

ally greater as voltages increase and, of course, as ratio of electrical energy per ton of finished product increases.

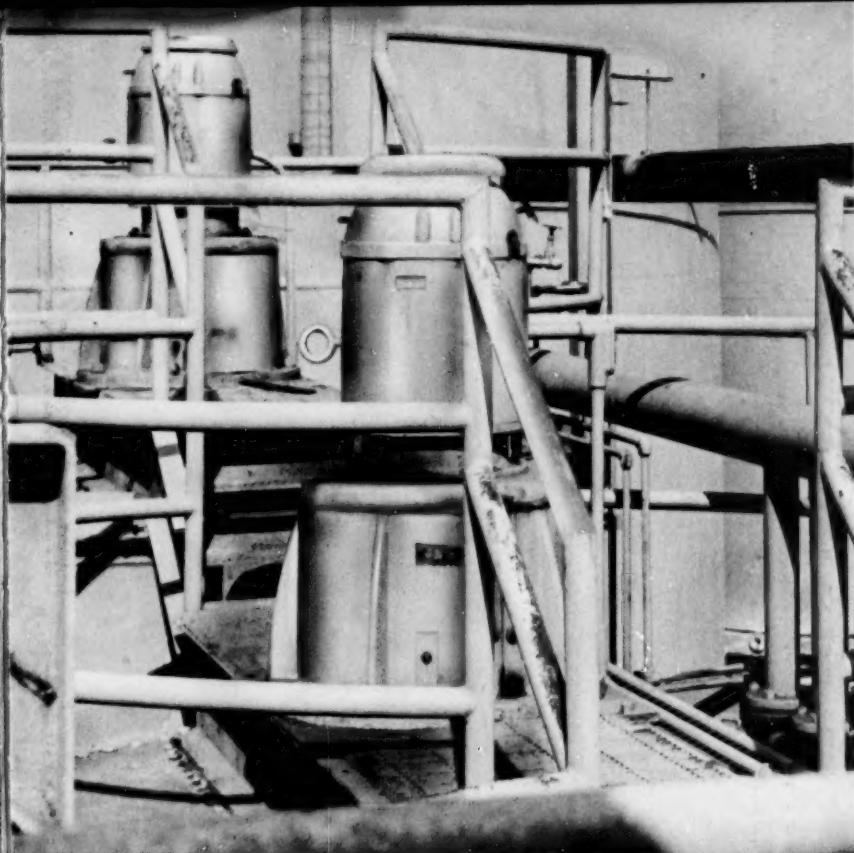
Operating headaches are eliminated, too—Ignitrons can be set up easily for automatic unattended operation. Availability of 99% or better in Ignitron installations often eliminates the need for stand-by equipment. Complete absence of moving parts drastically cuts maintenance. Ignitrons are inherently easier to protect against corrosion than any comparable rectifying equipment.

Westinghouse Ignitron Rectifiers offer you an unequaled opportunity for continuous throughput at rock-bottom cost.

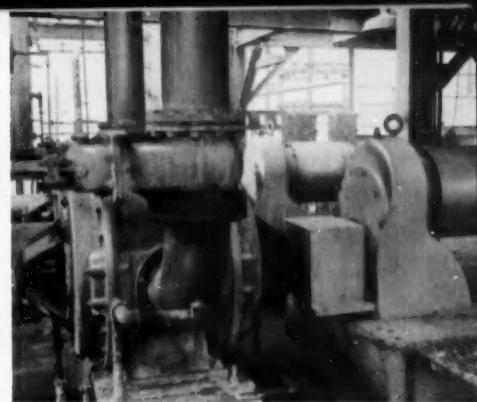


Bank of 48 Westinghouse Ignitron Rectifiers serving a chlorine production line.

Master chlorine rectifier control panel.



Life-Line Gearmotors, serving salt removal tanks, give automatic processing a boost with dependable, round-the-clock operation.



Life-Lines driving water recirculating pumps.



Westinghouse Control Center banks motor controls away from exposed production areas.



Gearmotors give vital 24-hour reliability driving pumps on salt removal tanks

Dependable, continuous circulation of tremendous amounts of water is critical in this plant. For the job, Westinghouse Gearmotors were chosen.

Both gear unit and motor in these compact units incorporate features that assure continuous service with a minimum of maintenance required. Accurately hobbed, specially treated gear teeth absorb heavy operating shocks and prevent damaging vibrations. Westinghouse Gearmotors have positive shaft sealing to prevent leakage of oil and entrance of foreign matter.

The Life-Line® Motor, an integral part of the gearmotor, is pre-lubricated—new 4-way seal bearings provide a continuous supply of motor grease without leakage and, above all, keep dust and dirt out.

Westinghouse Control Centers locate control conveniently for emergencies, away from danger areas

For power or light, Westinghouse Control Centers offer the modern way to group motor starters in centralized, planned-away-from-production areas. They are particularly suitable in plants where atmospheres are heavily laden with dust or chemical gases. Maintenance people can get at them quickly and easily.

Individual control cubicles can be removed or replaced in a few minutes. Each unit is safely insulated from its neighbors.

YOU CAN BE SURE...IF IT'S Westinghouse

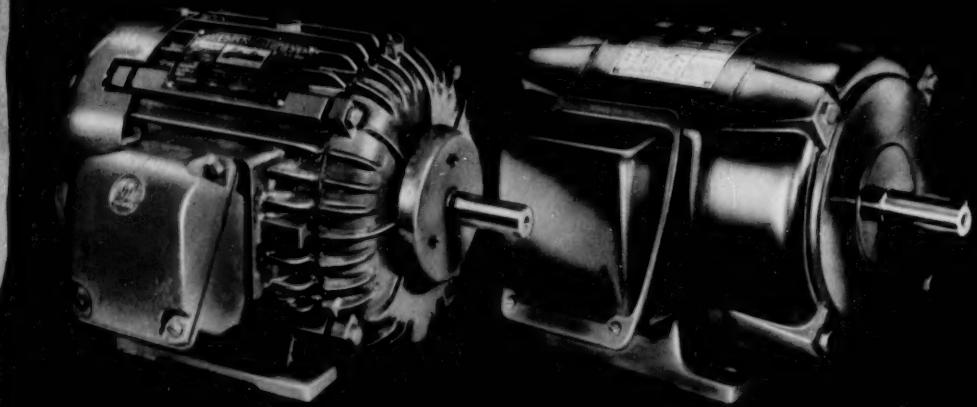
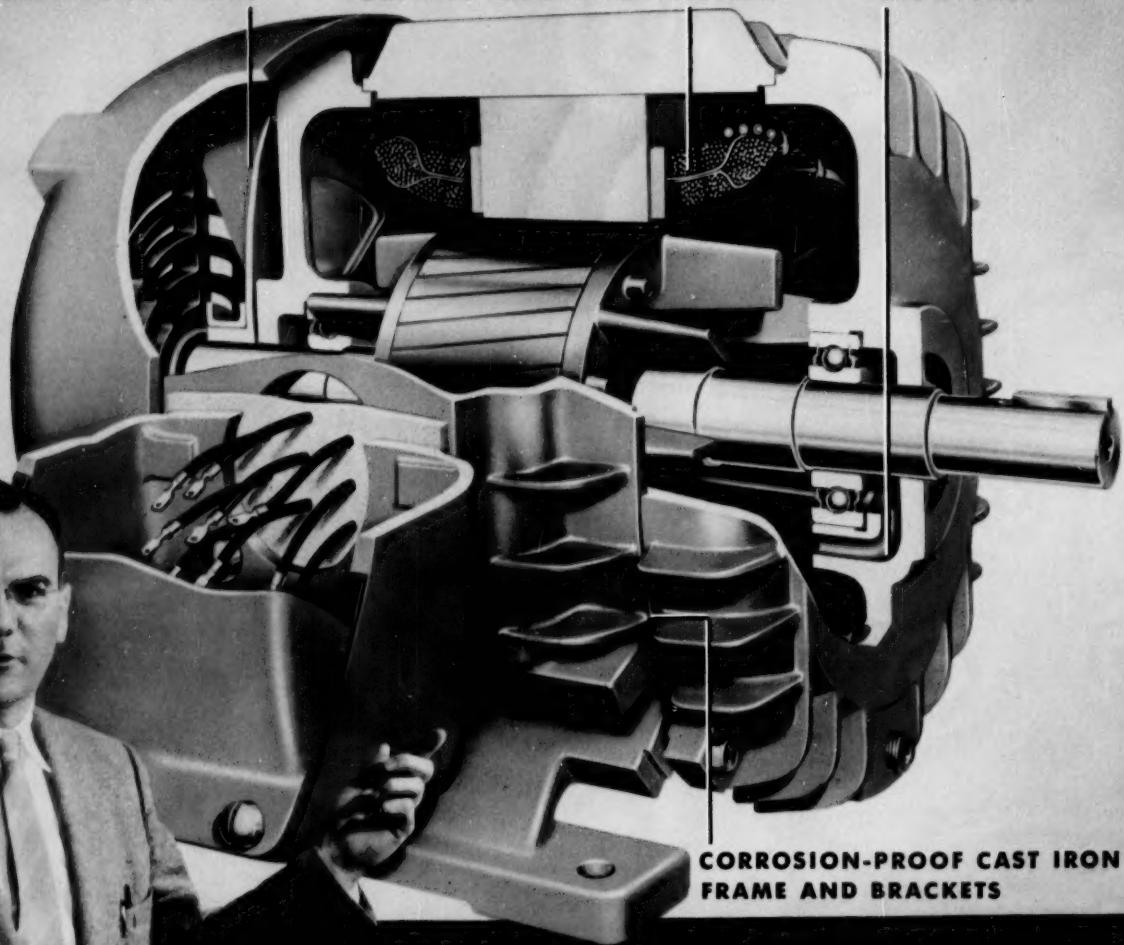


New *Life-Line A* motor in **CAST IRON**,

CORROSION-PROOF FAN

FORTIFIED INSULATION SYSTEMS

AIR BYPASS



and matching control for corrosion resistance, more production

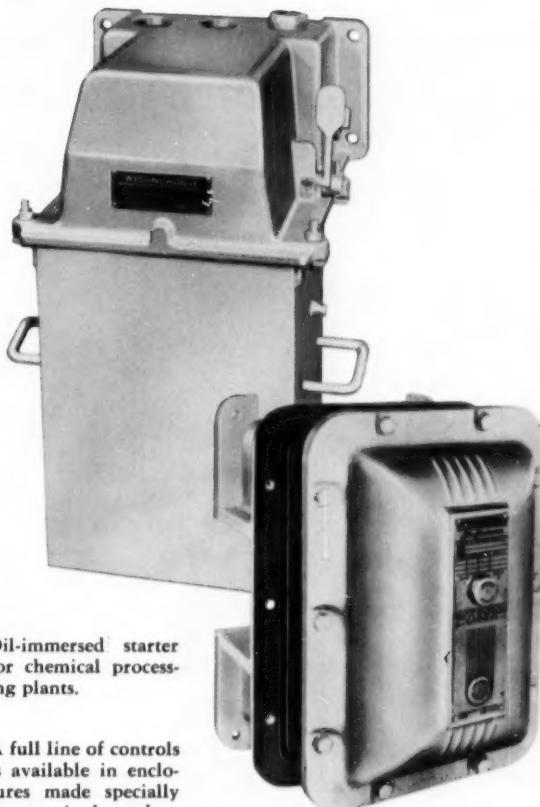
Setting big, new standards of performance is the new Westinghouse Life-Line "A" *better-protected* Motor. Here is a power package that is physically smaller, mechanically stronger and electrically longer lasting than *any* conventional motor.

Two basic models for all chemical plant applications—the dripproof for outdoor or other similar applications, and the totally-enclosed fan-cooled for corrosive applications—will assure you the same field-proved electrical performance Life-Lines have always given, but now in *CAST IRON* to withstand ravages of corrosive atmospheres. For 7-day week production, you now get:

1. Better protection for the lubrication system—new 4-way seal bearings, with double seals on each side of the bearing, effectively stop contamination. You still get the proved principle of pre-lubrication which prevents overgreasing or wrong grease—plus extra protection.
2. New fortified insulation: Mylar*, a slot insulation with greater dielectric and mechanical strength; Bondar, a wire insulation with more heat resistance; Bondite, a stator insulation with greater strength to withstand destructive elements.
3. New armored enclosure, in *CAST IRON*, gives you even better protection against corrosion from chemicals, liquids or dirt, as well as protection against physical impact, and can be located anywhere and in any position.

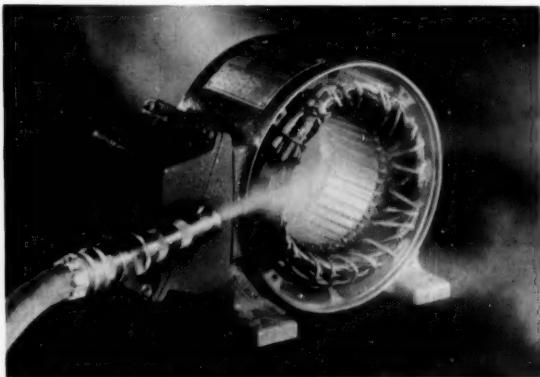
Rating for rating, horsepower for horsepower, the new Life-Line "A" Motor is the finest long-distance performer you can buy.

*DuPont Registered Trade-Mark



Oil-immersed starter for chemical processing plants.

A full line of controls is available in enclosures made specially for use in hazardous locations.



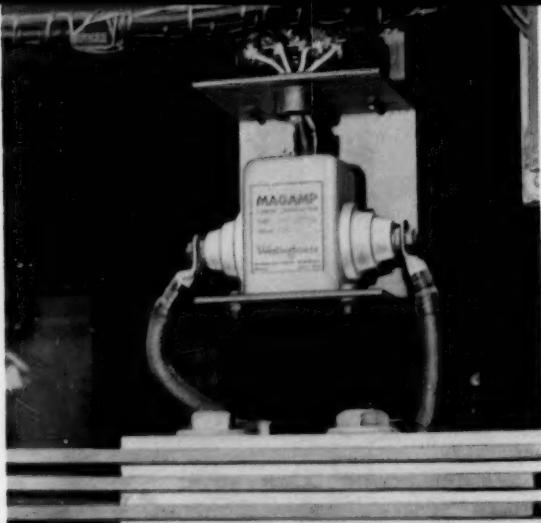
Life-Line's fortified insulation system provides higher thermal stability; resists moisture, oils, chemicals.



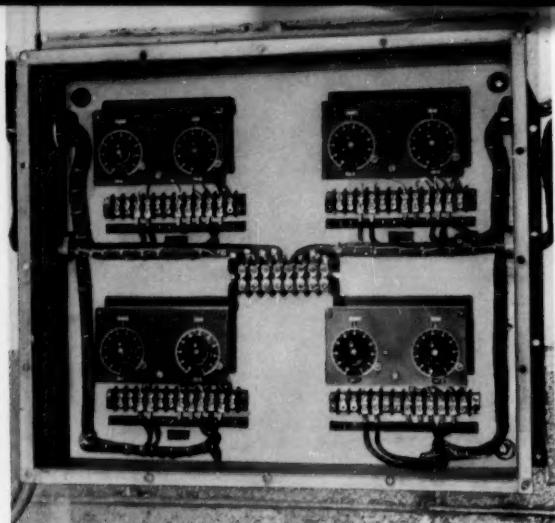
Here's a dust storm no motor will ever have to go through. Life-Line 4-way seal bearings stand up in any atmosphere.

YOU CAN BE SURE...IF IT'S **Westinghouse**





Westinghouse Magamp, transductor type, measuring amperage on a chlorine line.



Control panel serving Magamp unit.

Compact Magamp provides dependable check on d-c amperage consumed by Ignitron Rectifiers

A basic new regulating system, illustrated here on the chlorine line, is not only simpler and more compact than mechanical or rotating types, but is highly versatile as well. In this application, Westinghouse Magamp is used to totalize d-c amperage used in the banks of Ignitron Rectifiers.

Whether utilized for control of tension, voltage, current or speed, Magamp acts swiftly, accurately. Disturbances are instantly eliminated. Despite its small size and quick judgment, Magamp is ruggedly built, insensitive to normal shock and vibration. It has no moving parts—commutators, brushes, bearings—to wear, no tubes to burn out. It is a static device, and as such requires virtually no maintenance. Original resistor settings, made when the unit is installed, are permanent. Magamp is at your service and ready to go at the flip of a switch—no warm-up time needed.

For a low-cost production tool with high reliability in continuous operation processes, specify Westinghouse Magamp.

Westinghouse engineering can help you save power with the right combination of equipment

The most efficient, productive way to apply electrical equipment to arc furnaces or chemical processing lines is in an integrated system. Westinghouse builds all the necessary equipment, designed to work together. Why not put Westinghouse experience to work for you? Call us in early in the planning stage.

Inspection and repair needs are answered promptly by Westinghouse maintenance

Another important link in economical power supply can be the nationally recognized Westinghouse Maintenance and Repair Service, operated on the local level for fast—even emergency—service. To keep your plant producing, Westinghouse offers: equipment repair or reconditioning in 38 plants; inspection and on-the-spot repairs for equipment that cannot be moved easily through 56 field service offices; fast delivery of genuine Westinghouse Renewal Parts from stock in 31 locations.

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For product literature, check the coupon below, and mail to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

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<input type="checkbox"/> Speed Reducers	B-5646
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<input type="checkbox"/> The New Life-Line "A" Cast-Iron Motor	B-6154

<input type="checkbox"/> Motors & Controls in the Chemical-Processing Industries	B-4792
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DISTRIBUTION

metal, is certified for a load of 350 lbs. Plug and closure flanges, too, are being standardized.

In the high-pressure container field, use of manganese steel alloys is bringing weight decreases. (Fibrous glass-reinforced plastic is being used for nitrogen and oxygen cylinders to 2000 lbs. The plastic cylinder, avers Long, may be a comer.)

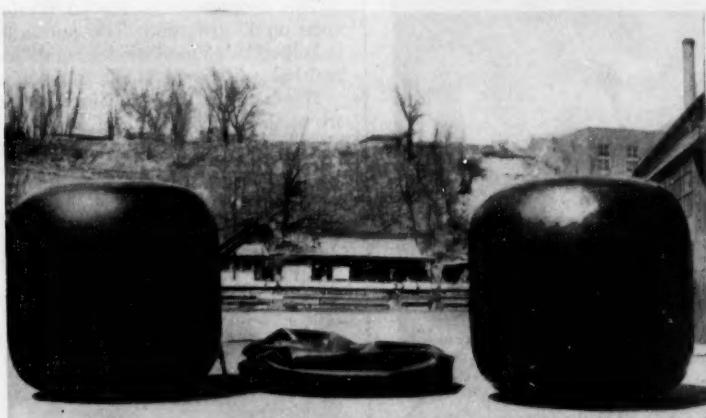
• Tough, strong, cheap containers can now be approximated by protectively coated steel. But, indicated Edward Grosscup, Inland Steel Container Co., the ideal lining, which is inert to chemicals and solvents, flexible and adherent, and easily applied, has not yet been realized. Polyethylene coating, now bottle-necked by unsatisfactory adhesion to steel, may prove to be the "universal lining" when adhesion difficulties are overcome.

• Jumbo fiber containers, capable of holding one ton of free-flowing, non-hydroscopic chemicals are increasingly being considered by producers. One other recent innovation in fiber drum packaging, declared George Benbury, Pennsylvania Salt Mfg. Co., is laminated plastic paper lining integral with the drum. Now being researched: a fiber drum with a molded polyethylene liner that will equip them for more

rugged service and reuse.

• Plastic containers will play an important part in the future of chemical shipping. Taking that position, Carl Pruett, Du Pont Co., traced the evolution of plastic containers, described new packages. One such container-type, seamless polyethylene drums encased by steel, is now available in 5-, 30-, and 55-gal. sizes, has recently been approved by the Interstate Commerce Commission. Less heavy, less costly than stainless steel, the drum handles corrosive chemicals that glass or stainless cannot. Glancing at the future, Pruett asserted work in progress may lead to fiber drum overpacks for carboys and plastic drums, possibly to elimination of overpacking for carboys.

• Its bright potential hardly scratched yet, aerosol packaging for 1954 will reach an estimated 200 million units, some 40% above the 1953 figure. And Herbert Hamilton of the Chemical Specialties Manufacturers Assn. believes that while future use will jump considerably, current problems need solving. These include valve redesign for nonclogging and better spray pattern; and container corrosion control. Glass and/or plastic containers may offer the "out" from corrosion.



Collapsible Containers

LATEST development in handling bulk shipments of granular and powdery materials is these synthetic rubber and fabric containers. Dubbed "Sealed-Bins" by their maker, U.S. Rubber Co., these giant bags, which are being offered in 500-gal. and 2500-gal. sizes, can be collapsed after emptying for return and reuse. Available after four

years of development and testing, these containers, claims the manufacturer, will reduce handling and packaging costs, permit low-cost bulk shipment, simplify receiving and handling by the user. Some chemicals already being shipped in the bags: polyethylene, polyvinyl chloride, carbon black, starch, clay and granular reclaim rubber.

**3
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The rapid pace of American Industry is matched by Stauffer's expansion since 1885. In 1953 alone, three more plants were completed to manufacture new products, as well as expand the facilities for others.

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DISTRIBUTION . . .

but they, too, need development.

It's clear that the conference signifies that chemical packaging, transportation, and labeling is dynamic, adjusting to contemporary needs. Improved tank cars, hopper trucks, mounting use of water shipment, larger and lighter containers, and packaging research all evidence the fact. And, it's evidence, too, of the significance the chemical industry is attaching to these nonsales functions.

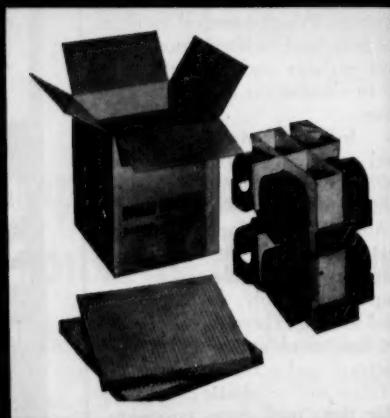
Analyzing a Wonder

That the phenomenal growth of the plastics industry is one of the wonders of our modern economy is, by now, pretty well agreed. That plastics consumption has increased by more than 95 times in the past 25 years—shooting from 33 million lbs. in 1929 to 3 billions this year—is a matter of established record. What may not be quite so well comprehended, however, are the underlying factors of distribution that have contributed to the amazing expansion in plastics.

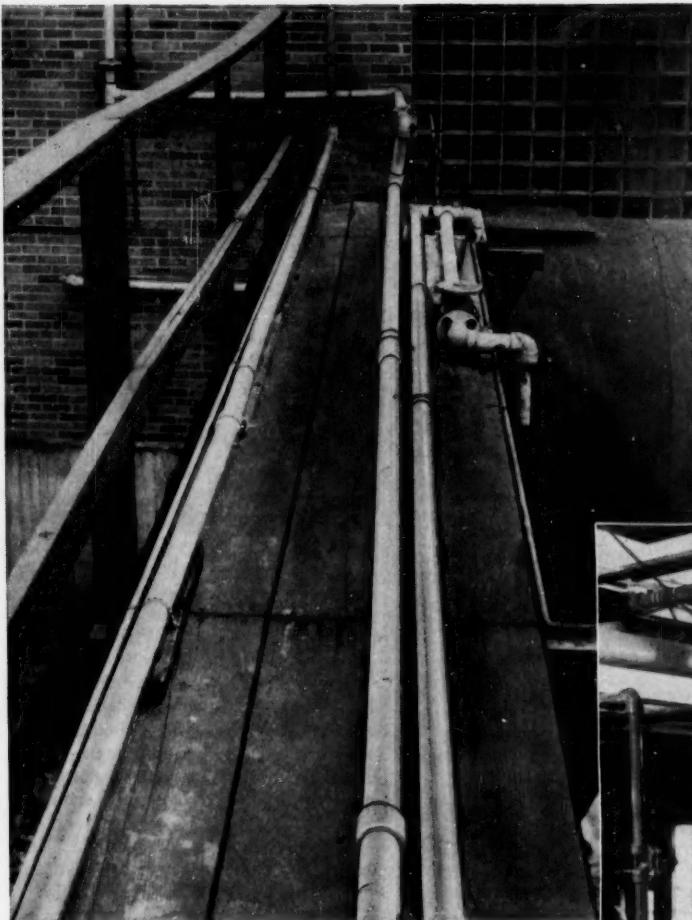
Last week, an authority on plastics sales undertook to analyze the reasons why, distributionwise, plastics have been a "natural" to succeed, and how on the basis of these same desirable distribution attributes, continued industry growth can be expected for at least 25 years to come.

The occasion: the Boston Conference on Distribution. The authority: Bakelite Co.'s Vice-President and General Sales Manager H. K. Intemann.

Points out Intemann: "Since plastics are neither mined like iron, nor grown like wood, but are put together from available chemicals, this industry en-

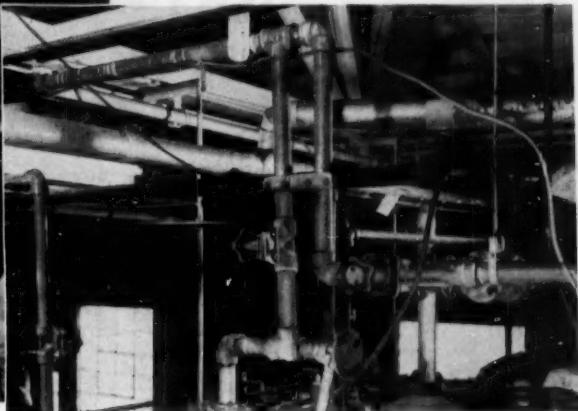


INTEMANN: His analysis of plastics success: mobility, adaptability.



**"We were fed up with
replacing piping
every 2 or 3 months,
so we put in U. S.
Uscolite Pipe 2 years
ago—and haven't
replaced a
length yet!"**

says manager of a midwest chemical plant



View of U.S. Uscolite Pipe carrying bleach on outside truck loading station. Years of exposure to every kind of weather have had no effect on this piping. (Right) Uscolite pipe carrying bleach to storage tank.

A chemical plant in Illinois makes sodium hypochlorite, for use in bleaches, laundry disinfectants, water purifiers. Until over 2 years ago, the piping that carried the chlorine and hypochlorite would fail every 2 or 3 months. This was considered a routine performance—until U.S. Uscolite® plastic pipe was installed. *Uscolite has now been on the job for over 2 years and shows no sign of deterioration and we have eliminated our troubles with metallic contamination!*

Another big point about Uscolite, says the factory manager, is that a part of the pipe is exposed year after year to the weather on an outside truck loading station. Any damage? "No, none whatever."

Uscolite is a product of United States Rubber Company. This great plastic is available not only in piping, but in pipe fittings, valves, and sheet stock for fume ducts. Uscolite is extremely light in weight, yet has very high impact strength. It resists acids, salts, alkalies, fumes—inside and out.

Rid yourself of piping problems. Next time you require new piping, or replacement of old piping, remember Uscolite. See any of our selected distributors, or call any of the 27 "U.S." District Sales Offices or write address below.

Uscolite pipe and fittings are made in the broadest and largest line of stock sizes of plastic pipe on the market. Sizes follow:

- Molded fittings in $\frac{1}{2}$ " through 4" I.P.S.
- Molded flanges $\frac{1}{2}$ " to 6" I.P.S.
- $\frac{1}{2}$ " to 3" Uscolite diaphragm valve (Hills-McCanna).
- Header pipes in 2", 3", 4", 6" pipe sizes.
- Pipe in standard wall dimensions and extra heavy wall dimensions in $\frac{1}{2}$ " through 6" pipe sizes.

"U.S." Research perfects it . . . "U.S." Production builds it . . . U.S. Industry depends on it.



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PIONEERS IN HYDROGEN COMPOUNDS

Metal Hydrides
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22 Congress St., Beverly, Mass.

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joys a degree of freedom from geographical limitation held by few established basic industries."

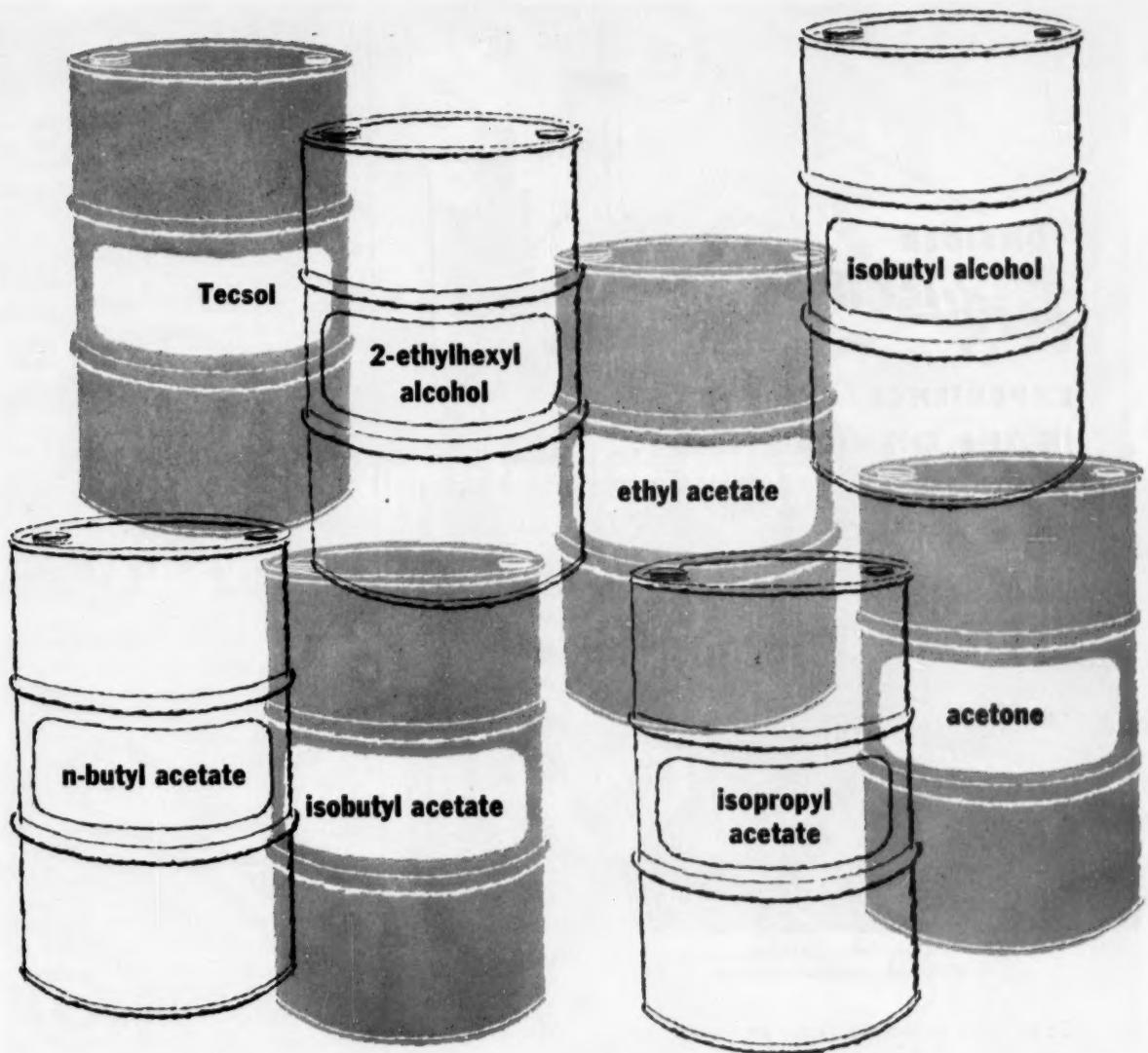
Another distribution factor that has contributed to the plastics expansion, according to Intemann, is the low capital investment required by the preponderance of small businesses that constitute a large part of the industry. "The small investment required gives the 4500 plastics fabricators high mobility and adaptability," he maintains.

Comparative lightness of plastics-making equipment also contributes to mobility. As a result, "these small units of the plastics industry thrive almost anywhere, spreading new industry about the country and fostering new economic growth in new localities.

"Thus," concludes Intemann, "this industry is singularly adaptable to shifts and changes in the economic structure that cause new and pressing distribution problems. Without elaborate or costly adjustments, it can adapt to large population movements, market shifts, industrial relocation and high delivery costs or freight rates."

Some other factors he cites as contributing to the \$5 billion worth of goods and services now stemming from plastics:

- Because plastics are suited to the streamlining characteristic of modern industrial design, designers are likely to give them serious consideration in reshaping a product.
- Because plastics have almost unlimited shape, color and texture variations, they afford the designer wide latitude.
- Because plastics can be fabricated into new and sales-provoking packages and containers, such as the "squeeze" bottle, they are assisting in the distribution of more and more products.
- Summing up the distribution qualities of this subject matter, declares Intemann: "This new star in distribution, is a rising star. The businessman of tomorrow will find the plastics industry the opportunity for the development of new industries and new markets."
- **Sponge Sales Drive:** Production difficulties now in hand, the O-Cel-O Div. of General Mills is posting plans for a strong national sales campaign for its sponges. As first steps to this end, the company is upping its national distribution zones from four to six and appointing new sales executives.
- **Sales Offices:** Ringwood Chemical Corp. has established a new sales office in Chicago.
- Food Machinery and Chemical



Eastman solvents

Eastman
CHEMICAL PRODUCTS, INC.

Kingsport, Tennessee

subsidiary of EASTMAN KODAK COMPANY

These products are stored in bulk at Kingsport, Tennessee and Lodi, New Jersey, by Eastman Chemical Products, Inc., and in Chicago, Illinois, by DeMert & Dougherty, Inc.

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; New York—260 Madison Ave.; Framingham, Mass.—65 Concord St.; Cincinnati—Carew Tower; Cleveland—Terminal Tower Bldg.; Chicago—360 N. Michigan Ave.; St. Louis—Continental Bldg.; Houston—412 Main St.; **West Coast:** Wilson Meyer Co., San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Seattle—821 Second Ave.

CONSIDER
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 EXPERIENCE
 IN THE CHEMICAL FIELD...

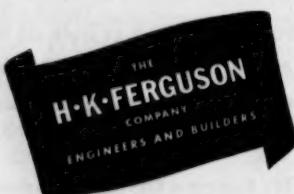


View of Courtaulds' (Alabama) viscose rayon plant, designed, built and equipped by Ferguson.

In addition to serving over a score of industries during the past 35 years, Ferguson has contributed its advanced engineering and construction knowledge to the amazing progress of today's chemical industries.

Ferguson has demonstrated specialized skill and experience in designing, building and equipping plants for viscose rayon, the production of which requires minute precision and control.

Our engineers and consultants will be happy to show you how these advanced economies can be put to work in your chemical expansion plans.



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DISTRIBUTION . . .

Corp. has opened export offices in New York City.

- Kaiser Aluminum & Chemical Sales, Inc. has set up a branch in Louisville, Ky.

- To coordinate activities of its new Chicago terminal with its two other Chicago terminals, Dow Chemical Co. has opened a new office. In addition to supervising the three terminals, the office will handle customer orders and invoicing.

Ready Reference: Sodium silicofluoride—tentative standard specifications for use in fluoridating water supplies. American Water Works Assn., New York.

- Croda Cithrol polyglycol esters—technical bulletin giving description, data and suggested uses of nonionic surface-active agents. Oil and Chemical Div., Croda Ltd., Croda House, England.

- Cor-U-Cel—A brochure describing a paperboard corrugating material made from straw. Alton Box Board Co., Alton, Ill.

- Insecticides—A new edition of the Insecticide Formulators' Manual (Technical Bulletin No. 42). It adds formulation suggestions for many newer pesticides. The Emulsol Corp., Chicago.

- How to Set Up Sales Territories—Outlines itemized procedure to evaluate sales potential and to organize territories. Covered are such topics as sales territories in new markets, guideposts for establishing territories, and assignment of market responsibility. Management Aid No. 55, Small Business Administration, Washington, D.C.

- Materials Handling: Organization of Engineering and Training.—Provides directions for organizing authority and responsibility in materials handling and summarizes the relationships of the various functions. No. 4, Materials Handling Institute, Inc., Pittsburgh.

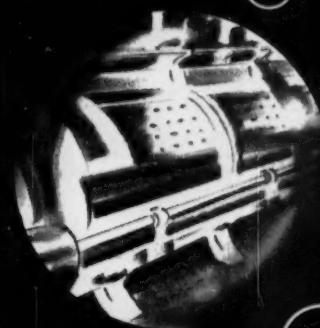
- Packaging ideas—just-issued "Creative Package Design" publication is offered as a "package evaluation and idea source for users of corrugated packaging." Public Relations Dept., Hinde & Dauch, Sandusky, O.

- Nitroparaffins—new technical data sheet indicates principal properties and potential uses of this newly available line of chemicals. Commercial Solvents Corp., New York.

- Methyl Cellosolve acetate—4-p. information sheet gives properties and suggested uses for this solvent. Carbide and Carbon Chemicals Co., New York.

car
washing

wet
cleaning



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with this all-purpose detergent...**

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Yes, you'll find a ready, profitable market for Sulframin HD Beads, Ultra's popular all purpose detergent, among restaurants and institutions in your territory. And you'll find that once customers try these fine-quality High Detergent Beads they'll keep on buying them—give you a steady repeat business.

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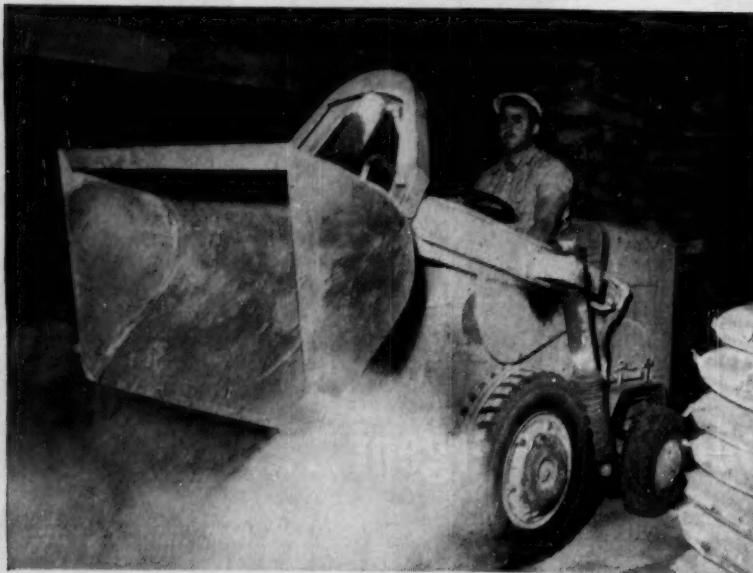
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PRODUCTION



1 SCOOP TRUCK replaces muscle work, saves time in handling bulk material.

Exit Manhandling

There's nothing unusual about a new plant that produces twice as much as its antiquated predecessor. But doing it with a work force less than half as large is a pretty neat trick. And that's just what Carstens Packing Co. does in its new \$180,000 fertilizer plant at Tacoma, Wash.

The key to this bit of legerdemain is the new plant's well-planned materials handling system. Originally designed by Chemical Engineering Co. (Green Bay, Wis.), it was modified by Carsten's own plant engineer to incorporate units tailored to each job.

In the old 12-man operation, room for improvement was everywhere in evidence. Bulk materials, shoveled by hand, were trundled about in wheeled buggies, weighed on platform scales. Bagged chemicals were manhandled around the processing equipment, measured by weight stated on the bags. The entire mixing and packaging operation was manually controlled.

But the new five-man installation is streamlined for mechanized movement of materials. Meeting the problem right at the front door, a scoop truck is the first machine to tackle incoming chemicals. Moving right into railroad cars, it transfers 600-lb. bites to a screw-fed bucket elevator rising 30 ft. to an upper level of the building. A 90-ft. belt conveyor takes

over from there, carries material along the length of the building between 10 storage bins. A 40-ton/hour shuttle conveyor, which distributes material to the proper bin for curing and aging, is arranged on a movable carriage to permit full use of the bins' combined 4000-ton capacity. Movable

partitions in the bins enable them to be enlarged or combined to fit flexible storage requirements.

From storage, the ingredients move again by scoop truck to an 8-bin, 15-ton hopper at the processing area. A one-ton weighing larry, rail-mounted beneath the hopper, measures out batch quantities in the desired proportions. Operated by one man, the larry is faster, more accurate than the old plant's hand-weighing system, which required three men. And what's more important, it assures greater uniformity of product.

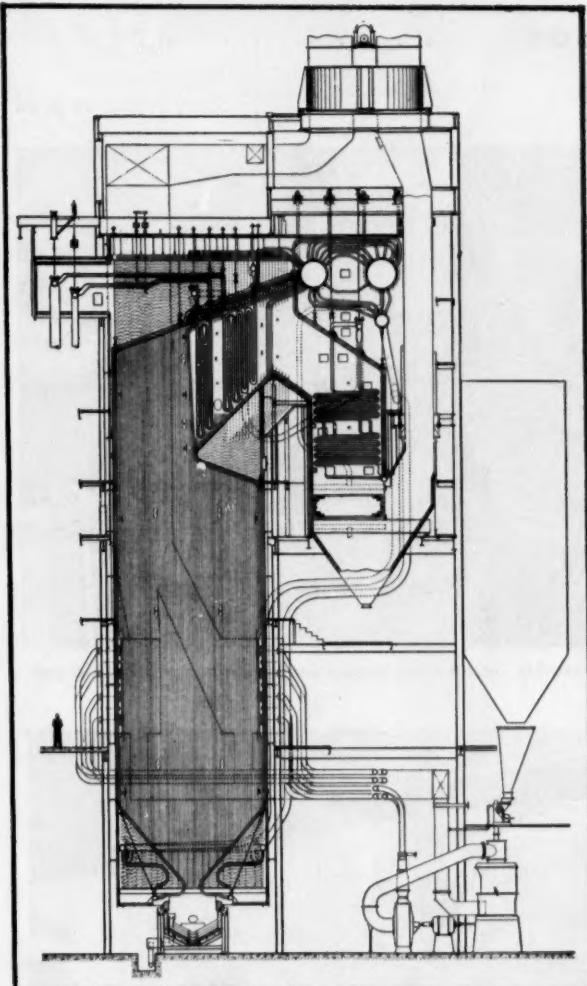
Materials are discharged from the weighing larry into a bucket elevator that feeds a batch mixer. A screen diverts oversize particles to a hammer mill. The automatic mixer blends the batch for three minutes, after which it discharges the finished fertilizer to a hopper in the packaging section.

A vibrating feeder transfers the fertilizer to a valve-type bagger that weighs 25- to 100-lb. bags automatically. A separate automatic scale and bag sealer puts out 1- to 10-lb. bags—a size the old three-man packing setup couldn't handle. Bags move by conveyor and chutes to railroad cars where two men load them for shipping.

With machines doing most of the work, labor requirements have been reduced from 1.6 to 0.33 man-hours per ton of finished product. Efficient handling of bulk ingredients permits additional savings on materials for



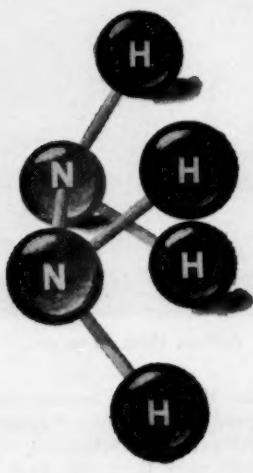
2 BELT CONVEYORS on traveling carriage fill bulk storage bins to the top.



from
Hydrazine,
greater protection
for boiler systems

In power stations and industrial steam plants, the use of hydrazine to control oxygen corrosion is now well established. Published reports of experience in this country as well as abroad indicate the efficiency of hydrazine treatment to: (1) remove trace oxygen from feed water, (2) safeguard superheater tubes in steam generating plants before they go into operation, (3) protect idle boilers. In boiler water, hydrazine reacts rapidly with residual oxygen to eliminate all traces of this dissolved corrosive gas.

from Hydrazine, new fields
for chemical research



Through greatly diversified research, more and more new applications of hydrazine are being discovered. In addition to its use as an oxygen scavenger in boiler feed water, hydrazine is an important component of plant growth regulators, and the basis of a new series of non-corrosive soldering fluxes. As a chemical capable of reacting with a wide variety of both organic and inorganic materials, hydrazine is the starting point for countless hydronitrogen compounds. Perhaps you could use the latest information on hydrazine and its many derivatives and how they might apply to your field of interest . . . if so, why not write today?



OLIN MATHIESON CHEMICAL CORPORATION
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2551

WATER CONDITIONING FOR INDUSTRY

Just Published!

Describes various types of conditioning apparatus in detail, including design features, control requirements, cost of installation and operation, and gives technical data needed for selecting and applying best processes for particular industrial needs. Covers such problems as corrosion control, boiler steel embrittlement, and apparatus which depend on water quality for correction. Emphasizes water treatment for high-pressure boilers, testing, and interpretation of test data. By W. E. Powell, Gen. Eng., 524 pp., 214 illus., \$9.00.

INDUSTRIAL DUST

2nd Ed.—Just Published!

Covers hazards of dust in industry, how to determine their existence, and how to combat them. Discusses physical substances composing dust and fume suspensions and their effects on man, analysis, measurement, and microscopy of fine dusts and particles, and the use of respiratory protective devices. Completely rewritten 2nd Edition covers engineering methods which help control Silicosis—inhalaion, retention and exhalation of particulate matter in air—specification and use of dust respirators, etc. By P. Drinker, Prof. of Ind. Hygiene, Harvard Univ., and T. P. Hatch, Prof. of Ind. Health Eng., Univ. of Pittsburgh. 2nd Ed. 371 pp., 176 illus., \$10.00.

SILICONES AND THEIR USES

For engineers, designers, and all who do or can use silicones, this engineering-slanted manual provides a correlated source of the available information on properties, preparation, and applications of silicones—both as technical and commercial. It covers all the commercially available silicone products... lists industries and known uses, they make of silicones, plus cost considerations... outlines history of silicone development, its possible uses in medicine and pharmaceuticals, and elementary chemistry of preparation of silicones from raw material to finished product. By H. R. McGregor, Administrative Fellow, Mellon Inst. 302 pp., 29 illus., 31 tables, \$6.00.

CHEMICAL BUSINESS HANDBOOK

Just Published!

A big practical guide to help engineering personnel in the chemical industries meet growing business responsibilities. In 20 big sections, 125 specialists show every essential aspect of market research, financial planning, and management of other business operations—especially applied to the chemical field. Gives you fundamentals and operations of effective business management... dependable facts to help you handle problems and responsibilities in this field. Edited by J. H. Perry, formerly with the American Dept., E. I. du Pont de Nemours and Co. 1330 pp., 438 illus., \$17.00 (Available on terms.)

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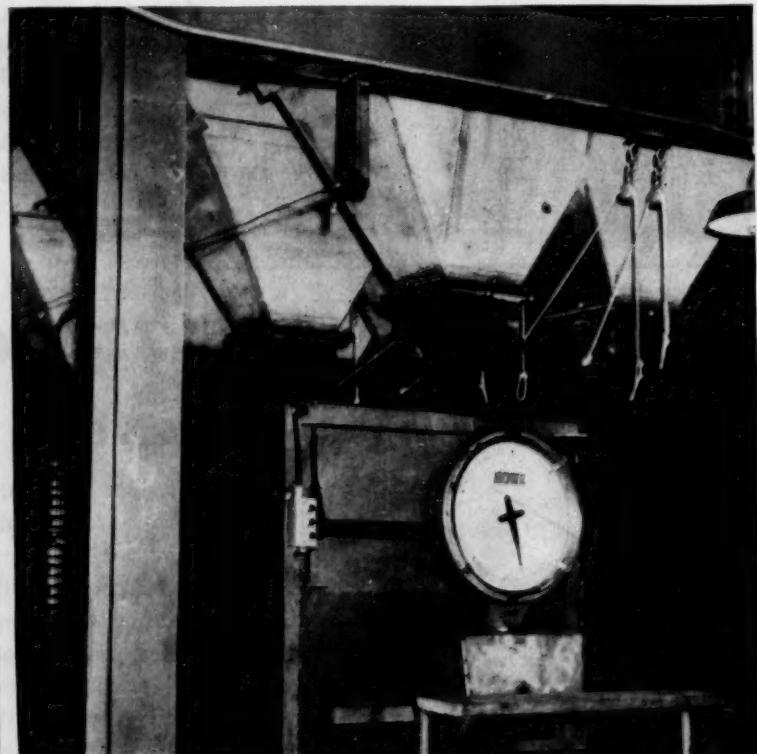
CN-10-30

PRODUCTION.

Story begins on p. 62



3 HOPPER BINS provide intermediate storage for chemicals at processing end.



4 RAIL-MOUNTED LARRY weighs ingredients, delivers them to mixer.

merly purchased in bags as a concession to handling limitations. (Bulk ammonium sulfate, for example, is \$3/ton cheaper than bagged shipments.)

Of course, it isn't every plant that

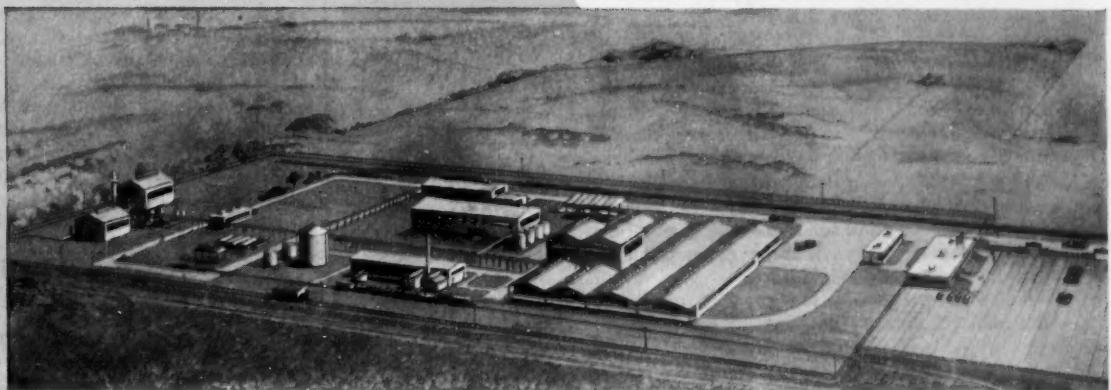
can make this much improvement. But as product and process requirements change, there are many who could profit more than they have by putting mechanical brawn on the production team.

Another **SD** project

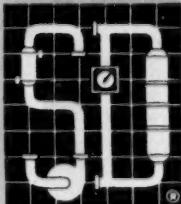
SD congratulates General Tire on the start-up of their new mono and polyvinyl chloride plant at Ashtabula, Ohio. This is another important step in the company's plans for product diversification and technological leadership.

The General Tire & Rubber Co. enters pvc field with modern \$6,000,000 plant

In addition to producing a superior PVC, General Tire's new plant includes a sales-service laboratory for aiding its customers in the use of their products. Comprehensive pilot plant facilities, capable of producing sufficient quantities of new polymers for complete field trials, are also available to General Tire's customers.



Specialists in
Organic Chemicals
Plant Design



This is the second "SD-Designed" PVC plant. The first, also employing a suspension process, was built for one of the largest chemical firms in Europe and has been in production since early 1954.

Scientific Design Company, Inc.

Executive Offices: 2 Park Ave., New York 16, N. Y. • Engineering Offices: Jersey City, New Jersey



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The new FEinc horizontal filter, simple, trouble-free, is recommended for free-filtering materials such as coarse granules, or fibrous cakes. Counter-current washing is available.

FEinc scraper filters, for standard problems, are quality built, with many special constructions, such as rubber covering, totally enclosed housings, etc. On filter at right, for instance, drum submergence can be varied at will from zero to 30%.

Ask today for full details or analyses . . . no obligation, of course.



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PRODUCTION

Accident

It started out as a routine day. In the Medical building doctors were busy with appointed tasks; there was the usual flow of individuals past the reception desk. At 9:30 a.m. the first ambulance call sounded; the doctor on dispensary duty took the call. The plant whistle sounded the fire call; a second alarm came in, more help was needed in the field immediately. This was an acute emergency.

The telephone rang; hydrogen sulfide fumes were escaping from a ditch near the Hydron Blue building, "people were dropping like flies." Various conveyances were pressed into emergency service. Within minutes, unconscious individuals started arriving at the Medical building for treatment. Doctors, nurses, technicians were all busy applying artificial resuscitation, oxygen masks. Some of the patients developed violent muscular contractions.

All patients were closely watched for the next three hours; 10 required further observation, four were in serious condition. Of the 22 individuals brought to the Medical building, 21 recovered, one died at 9:15 that evening. Without a well-planned plant medical setup, this fatality would not have been the only one.

Statistic: This was an accident. It was thoroughly investigated, became another statistic in company records. From such records and statistics has come the know-how of modern occupational medicine.

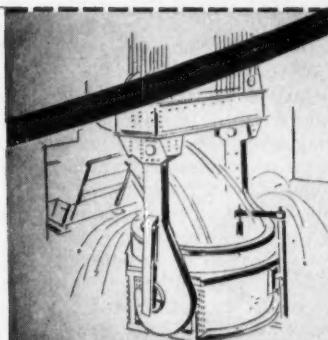
Contributing in large part to the compilation of such records, the 166-doctor medical staff of the Du Pont Co. has in the process contributed grist to another mill. In a new book titled "Modern Occupational Medicine,"* Editors Allan Fleming, M.D.; C. A. D'Alonzo, M.D.; and Associate Editor John Zapp call upon 17 other Du Pont contributors, make use of the staff's combined experience to present the general principles and methods of industrial preventive medicine in a single volume "that will be readily useful to physicians, executives, safety engineers and chemists in industry."

This is essentially a how-to book; it is significant to the chemical process industries because it was written by a medical team active therein. Most of the material will prove useful to all industrial medical groups, but some of it is specially slanted toward those in the process industries.

Toxicology: Of special interest to chemical men, of course, are sections dealing with chemical health hazards.

* Lea & Febiges (Philadelphia), \$10.

What has aluminum got to do with...



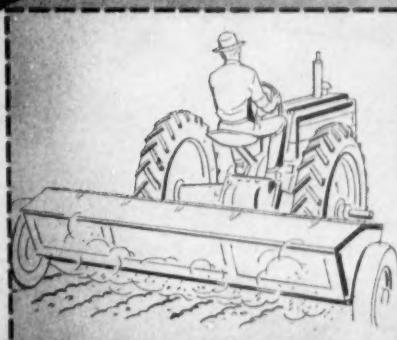
Making steel?



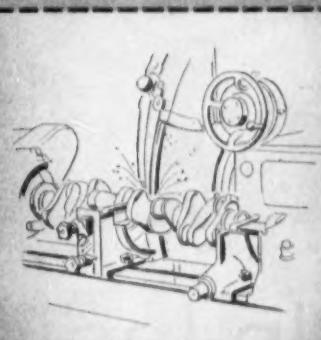
Salting an egg?



Purification of water?



Raising potatoes?



Grinding a crankshaft?

Alcan Chemicals are the answers

Alcan (Aluminum Company of Canada, Ltd.) offers industry the basic chemical ingredients used in ingot production and other chemicals associated with the aluminum processes. Many of these Alcan Chemicals are regularly used by industry to improve process applications and product quality.

In saltcellars, alumina, activated, absorbs moisture, makes salt easier to shake. For water purification, aluminum sulphate and chlorine are widely used in water treatment. Open hearth furnaces use magnesium oxide refractory bricks to increase steel output. Magnesia fertilizer is responsible for higher-yield potato crops. Alumina and bauxite are widely used for high quality abrasive wheels.

These are only a few of the jobs done by Alcan Chemicals.

Co-operating in the production of Alcan Chemicals are a number of affiliated companies. Each of these sister companies specializes in its own field of endeavor such as: Laboratory research . . . exploring, mining and processing raw materials throughout the free world . . . development of shipping methods for the protection and speedy delivery of products.

One of Alcan's sister companies, Aluminum Limited Sales, Inc., distributes Alcan Chemicals in the United States. The office near you will be glad to help you with your special chemical requirements.

ALCAN CHEMICALS FOR INDUSTRY

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Alumina, Calcined
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Aluminum Chloride,
Anhydrous
Aluminum Fluoride
Aluminum Sulphate
Bauxite
Chlorine, Liquid
Cryolite, Artificial
Fluorspar
Lime
Magnesia
Magnesium Chloride,
Anhydrous
Sodium Fluoride
Sulphuric Acid

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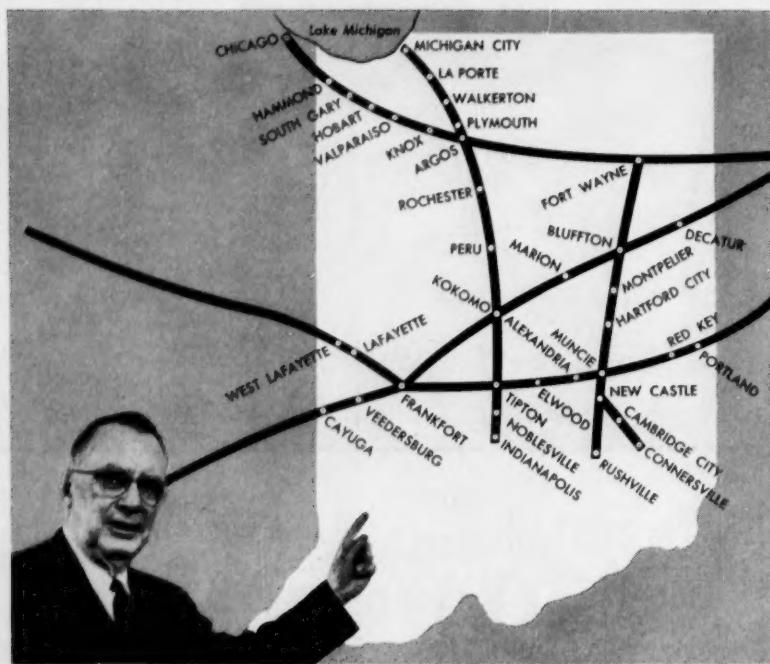
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H. Horton Hampton, Vice President, Industrial Development, Nickel Plate Road.

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Electric power capacity is 10% more than U. S. average per capita.

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Superb public schools, 38 colleges and institutions of higher education, 16 state parks, 14 state forests, 4 well-stocked game preserves and 13 fish hatcheries make living and working worth-while.

An \$80 million surplus, unencumbered, and a state constitution which *forbids* bonded indebtedness means—tomorrow's new industries don't pay yesterday's bills.

PRODUCTION . . .

Here are discussed the more toxic chemicals, their entry into the body, their internal and external affects, and recommended treatment.

In another chapter is detailed the use of protective clothing for the chemical industry. As with all phases of medicine, declare the authors, preventives are far better than remedies. Such things as hydrofluoric acid burns are easy enough to avoid by using proper gloves, but once there is exposure and blisters form, all the white, raised skin has to be cut away.

Other sections deal with the inherent disposition of certain persons and process operations to specific toxic effects. The idea is to place a person in a job suited not only to his education and experience, but also to his physical and psychiatric capabilities—avoid his weaknesses, keep him away from sensitive situations. With an operation, engineer it to its peak safety, anticipate hazards, set up adequate safety measures, and keep the place clean.

A section on acute poisoning is included, say the authors, because of all the calls they get from doctors and frenzied mothers. They figure that a chemical company will have all the answers even about common household poisons.

Organization: If a plant offers any medical service at all, one of the first things the plant manager should do is match his facilities against a check list provided in the book. Included: Is there a full-time physician for every 800-1000 employees? Is the doctor treated as a regular staff member? Does he have adequate diagnostic equipment—for example, X-ray and laboratory facilities? If there are no medical services available, the check list provides the plant manager with a starting place and points him in the right direction.

Other chapters go over administration, functions, location, personnel, layout and equipment. The editors present a floor plan for a well-designed medical installation for a small plant, point out such things as the advisability of putting the first-aid room close by the reception room because it is the one most frequently used. Functions of the industrial hygiene laboratory are discussed as are the potentials of immunization in industry, the effects of temperature, humidity, and air movement, the medico-legal interplay, noise and radiological hazards, fatigue, and the "occupational back" among others.

Psychiatry: Also among the more fascinating parts of the book are the chapters on the industrial applications of psychiatry and the rehabilitation of the alcoholic worker. According to the

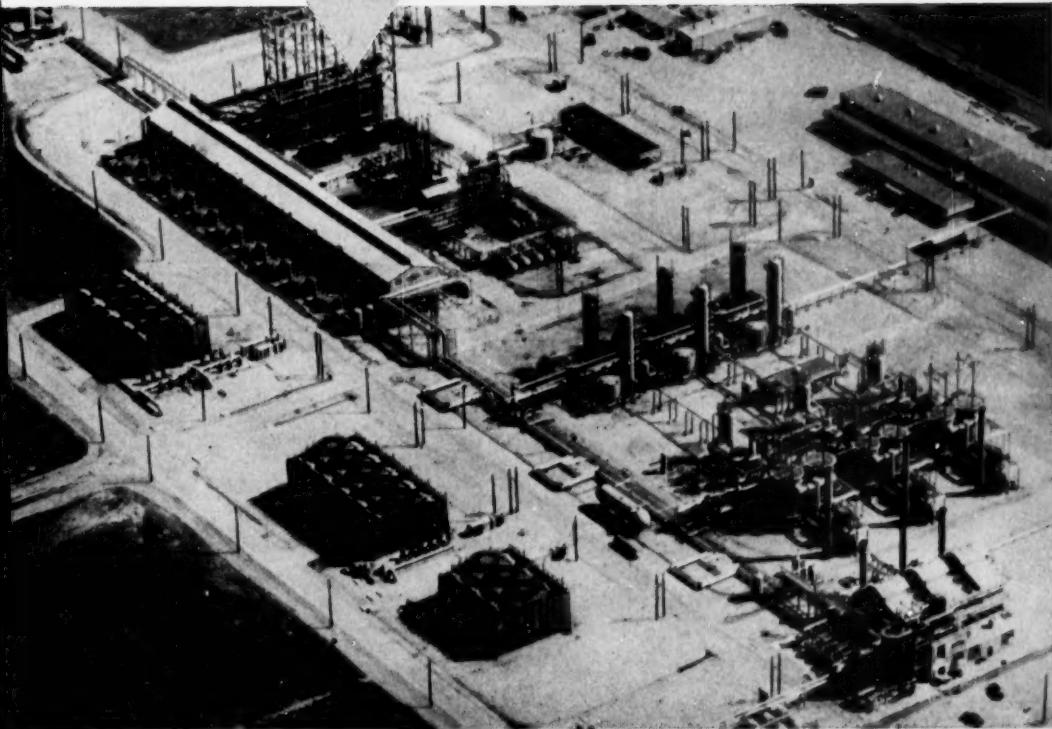


The New York, Chicago and St. Louis Railroad Company

For detailed information about industrial sites in this or other areas along the Nickel Plate Road, call or write:

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New Economies in Synthetic Ammonia Production



The new synthetic ammonia plant of Phillips Chemical Co. (wholly owned subsidiary of Phillips Petroleum Co.) near Houston, Texas, designed by Chemico, marks important advances in economy of construction, production, operation and maintenance. Some of the features of this 450 TD plant are listed in the adjoining column.

The efficiency and dependability of Chemico ammonia plants is the result of more than 20 years of experience and continuous research in this field.

In the production of other heavy chemicals, too, Chemico has long been a leader in originating new processes and designs. Whatever your requirements may be, it will pay you to consult Chemico, for "Chemico Plants are Profitable Investments".

Less power required for compression, because of use of part of initial pressure of the natural gas.

Less fuel cost, because of full use of waste heat and waste gases.

Lower-cost carbon steel for converters, because of lower wall temperature resulting from internal heat exchanger and flow of cold incoming gases along the walls.

Longer catalyst life, because of cooling tubes in catalyst bed.

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B&O's locating a 2500 acre site for a mammoth aluminum sheet and foil mill near Ravenswood, West Virginia further underscores the trend toward *this land of Big Opportunities*. A billion dollars in recent new plants proves it!

Here's a land of *big sites*, atop extensive natural resources, with an abundance of power and people, close by America's prime markets. You know about the big, basic plants already in the area—smaller neighboring sites, too, are ready! The Nation's *first ISOCYANATE* plant, at Natrium, just announced, located on one of them.

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PRODUCTION

book, the behavior of a minority group of individuals creates the majority of problems for management; these problem individuals are victims of an illness fostered by tolerating improper or inadequate behavior. As a remedy, effective discipline is prescribed, for it promotes mental health.

For the alcoholic in industry, rehabilitation is suggested as a worthy venture in the field of human relations and public health. The rehabilitated alcoholic can be converted into a valuable employee. As with all phases of modern occupational medicine—prevention, treatment, remedy—rehabilitation, too, pays off for management.

EQUIPMENT

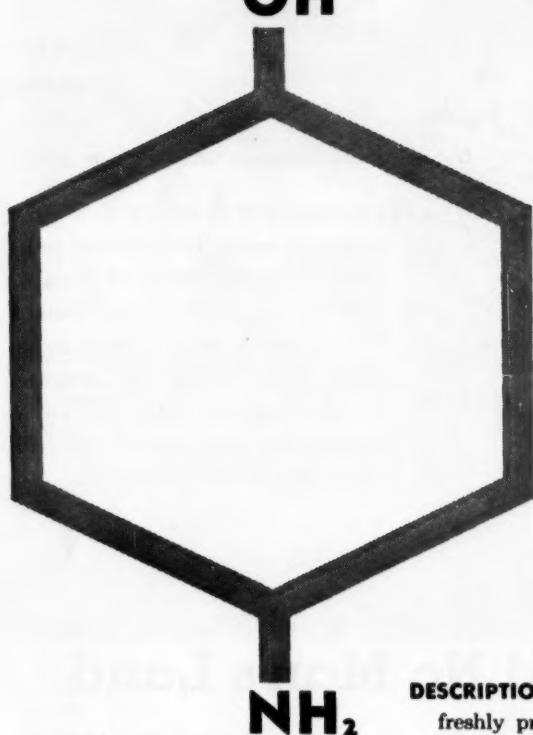
Two-Way Tool: Developed in conjunction with municipal and industrial authorities on air pollution, Mine Safety Appliances Co.'s (Pittsburgh) Smokescope can, says MSA, be used to uncover inefficient operations as well as ordinance violations since incomplete processing (e.g., partly burned fuel) readily reveals itself in its more dense smoke. Moreover, claims MSA, the "Scope" overcomes the main disadvantage of standard smoke charts: it is convenient; it permits direct comparison of smoke and standard without having to refocus the eye; it avoids variation in readings caused by differences in illumination.

Redesigned Cyclones: To its standard 6-, 12-, and 24-in. diameter Dorr-Cyclones (wet classification cyclones), the Dorr Co. (Stamford, Conn.) has added replaceable molded rubber inserts. Designed as standard equipment on these units, the rubber linings, claims Dorr, will decrease wear on interior surfaces, are easy to replace.

Safety Valve: In order to make sure incoming gas lines won't add fuel to any fire that might break out, Valco, Inc. (Cincinnati) has introduced its model 350 safety shutoff valve. Designed for installation just ahead of the gas meter, the valve closes, shuts off fuel feed as soon as fire melts the fusible alloy holding it open.

Flexible Filler: A liquid filling machine that will fill containers of any size from a fractional ounce to 16 ounces and any shape without changing the feed setup is the latest offering of MRM Co., Inc. (Brooklyn, N.Y.). Working at production speeds up to 75 units/min., the feed setup consists of a series of flat plates mounted on a chain and permanently synchronized with the filling nozzles.

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• DYES



• ANTI-OXIDANTS



• PHOTOGRAPHIC
CHEMICALS



• OIL ADDITIVES



DESCRIPTION: p-Aminophenol Technical is a light brown powder when freshly prepared, which darkens considerably on exposure to air. It is soluble in aqueous caustic alkali and dilute hydrochloric acid and may contain up to 0.5% hydrochloric acid insolubles as impurities.

SPECIFICATIONS: Purity: 97.0% minimum, by nitrite absorption.
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WRITE US for complete information about this valuable intermediate. And if your process calls for a specific product, remember Du Pont has the facilities to produce custom-made intermediates—perhaps one that will meet your exact requirements. Our technical men will be glad to study your problems and work with you in product development.

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Organic Chemicals Department, Chemicals Division
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CHEMICALS DEPARTMENT

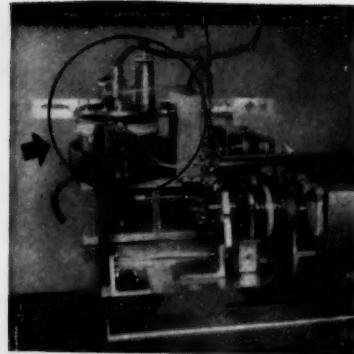
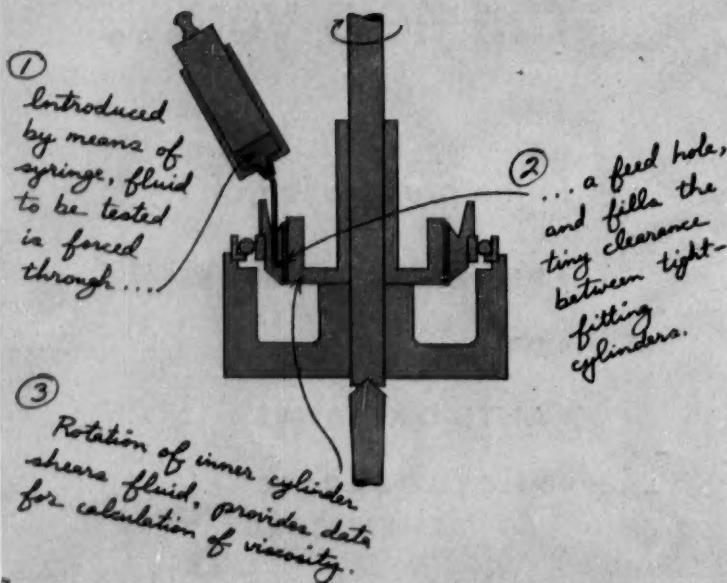


BETTER THINGS FOR BETTER LIVING
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RESEARCH

New viscometer...

... puts shear to work



VISCOMETER CLOSEUP shows experimental model. Heart (circled and dissected at left) consists of coaxial cylinders with fluid between them. Spun by motor, inner cylinder puts torque on outer. This force, gauged by strain cell, and spin speed give measure of viscosity, which is plotted on x-y recorder (not shown).

New Weapon for Liquid No Man's Land

thixotropy, n. The property, or phenomenon, exhibited by some gels, of becoming fluid when shaken. The change is reversible. —*Webster's New International Dictionary Second Edition, Unabridged*

No printed definition can do justice to thixotropy. To appreciate it, you must live with it—and that can be a lively and often hectic experience. No one understands this better than the chemical research man who for years has been locking horns with thixotropy and usually coming off second best in such a seemingly simple test as measuring the viscosity of thixotropic liquids. This week his vista was brightened by the rapidly maturing work of an enterprising professor of chemical engineering at Massachusetts Institute of Technology.

He is energetic young Edward Merrill, and he has designed and built what may be the first practical viscometer for the rapid, reliable determination of the viscosity of thixotropic fluids.

The result of more than two years of

intensive effort, the Merrill viscometer could be a near-invaluable helpmate to researchers in a broad swath of the chemical process industries. Paints, varnishes, lubricants, printing inks and polymer solutions of all kinds are only a few examples of products that may be thixotropic. A complete picture of their viscous behavior under different conditions is vital if they are to be used and studied intelligently.

Precisely because they are thixotropic, these materials are commercially valuable. But it's this same property that makes them a researcher's nightmare. Viscosity of thixotropic substances may vary widely in relation to applied shearing stress. The big questions are: How viscous will a thixotropic substance be under a given shearing stress? How does viscosity change under varying stresses? And how is viscosity affected by varying periods of constant stress?

In practical terms this may translate to: How well will a paint flow under the shearing stress of a brush stroke? Or, how will a solution of synthetic-

fiber polymer behave on being forced at high speeds through a spinneret?

For want of a versatile viscosity measuring instrument, all such queries cannot be answered to the satisfaction of a considerable body of researchers.

They have no quarrel with most viscometers insofar as Newtonian liquids are concerned. But, by the same token, none of the conventional instruments is considered to be entirely adequate for the measurement of the entire range of non-Newtonian^{*} liquids. Falling ball and capillary viscometers, which are satisfactory for most Newtonian fluids, may be utilized for non-Newtonian determinations only if extensive calculations are applied.

According to Merrill, moreover, the usual types of coaxial cylinder viscometers—particularly those incorporating a torsion wire—have other shortcomings for the testing of non-New-

^{*}Those liquids that do not conform to Newton's law that the homogeneous shearing stress is the product of coefficient of viscosity and rate of shear. The viscosity of these liquids depends largely upon the history of work done on them. Not all non-Newtonian liquids are thixotropic, but all thixotropic liquids are non-Newtonian.



... and the improved economics
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Anyone interested in better chemical processing will see eye to eye with Imperial Chemical Industries on its modern ethylene plant. Here's why:

- (1) High yields of olefins
- (2) High purity of products
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- (4) Flexible operation

These reasons convinced Montecatini, too. Result: a similar Kellogg-engineered plant is now going up at Ferrara for this world-famous Italian chemical producer.

The improved economics of these olefin-from-petroleum plants are fresh proof of the contributions advanced engineering can make today for tomorrow's better processes.

* Ethylene plant in operation for three years
for Imperial Chemical Industries, Ltd. at
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In this process, Kellogg engineers applied a new principle to the cracking of petroleum fractions . . . pyrolysis in the presence of high-temperature steam to increase yields of desirable products and to reduce coking. In addition to naphtha, gas oil, fuel oil, casinghead gasoline, and residuals, steam pyrolysis for olefin production is applicable to conventional ethane and propane feeds.

Developments such as this are the goal of "Engineering for Tomorrow" . . . typical of Kellogg's continuous efforts to prove out new ways to better yields, bigger profits, less down-time.



For detailed information on Kellogg's processes for ammonia, urea or ethylene write: CHEMICAL PROCESS DIVISION, The M. W. Kellogg Company, a subsidiary of Pullman Incorporated, 225 Broadway, New York 7, New York.

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RESEARCH . . .

tonian fluids. Lumped in this broad category are such viscometers as the MacMichael, Stormer, and a number of their modifications. Although they enjoy varying degrees of popularity, all do a good job within the scope of their abilities.

Their weaknesses in the testing of non-Newtonian and, particularly, thixotropic fluids are reputedly inherent in their design. In one type of instrument, a cylindrical bob is suspended by means of a torsion wire in a cup that contains the fluid to be tested. Viscosity is determined by rotating the cup and measuring the torque on the torsion wire required to counteract exactly the rotational force. With the second type, the bob is rotated and the resulting torque yields a measure of viscosity.

In both, however, the space between the periphery of the bob and the cup wall is relatively large and inconstant, permits considerable variation of the rotational rate of shear in the fluid under test. In addition, these instruments generate relatively low rates of shear, are virtually inoperable with gels, and lack the means to accurately control the temperature of the fluid under test.

Since viscosity is a variable function of shearing stress, or stress and time, it's obvious that anything but a specific value for these factors will give a meaningless value of viscosity. Conventional viscometers just don't give this specific value for all non-Newtonian fluids.

Special instruments are available for the testing of specific fluids such as paints, printing inks and lubricating oils. But their scope is severely limited, precludes their use with polymer solutions, for instance.

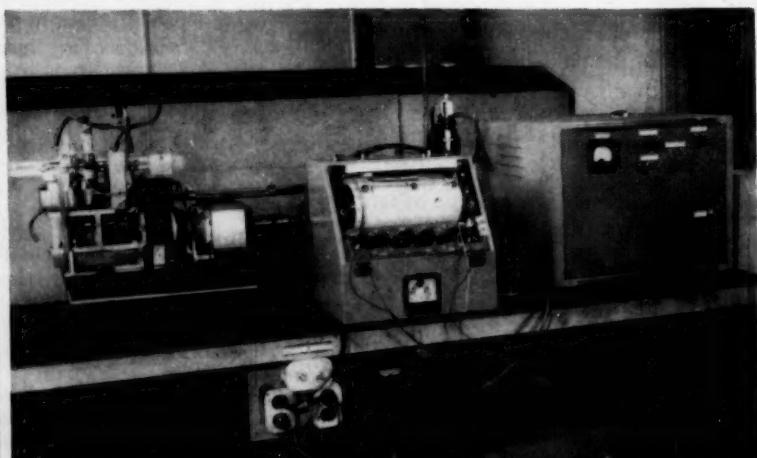
This situation poses trying problems for those companies with products caught in the "no man's land" of viscosity measurement. An outstanding case in point is Dewey and Almy Chemical Co. (Cambridge, Mass.), whose adhesives, latices and sealing compounds, etc., form resin solutions that are commonly non-Newtonian and, more often than not, thixotropic. These materials are used in can manufacture (among other things) where they are applied by high-speed compound applying machines.

Owing to the lack of an instrument that would give an accurate measure of viscosity of these products at the high shearing stresses of actual operation, there was no thoroughly reliable scientific method of predicting how they would flow through the nozzles of the machines used in can making.

Every once in a while, a sealing compound that looked promising in the laboratory would give unexpectedly poor results in actual machine tests. But perhaps more importantly, an occasional laboratory "dog" would inexplicably prove to be a success under machine operating conditions. Through no fault of the company's experience and highly skilled research staff, several potentially valuable substances may have slipped by unsuspected.

This state of affairs was particularly disconcerting to company patent attorney Theodore Browne, who faced the trying task of trying to document new-product patent claims. Browne carried his quest for meaningful data to MIT's Merrill, a Dewey and Almy consultant and onetime employee, who already was working on a viscometer specifically for these fluids.

With company aid, Merrill came up



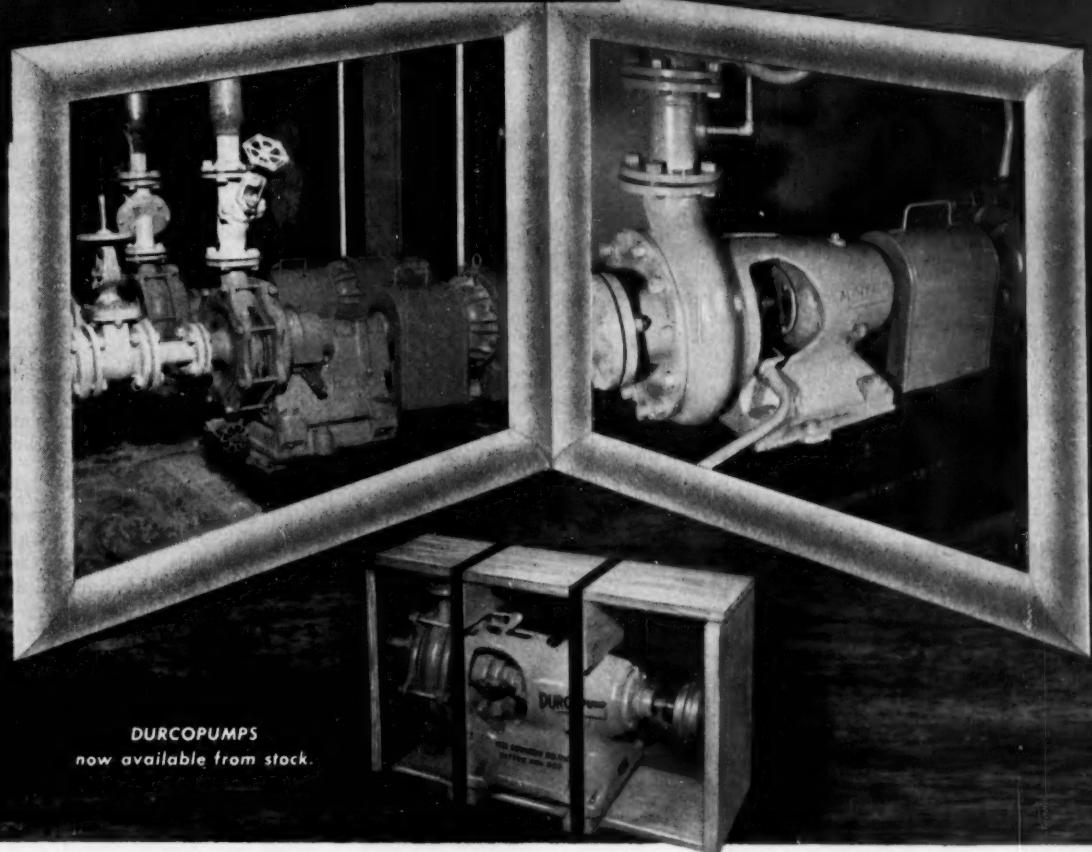
MERRILL VISCOMETER: On the 'bread board', a link with theory.

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Durco has served Hercules for many years. The model 30 pumps pictured at the left (above) were installed about 1939, and are still in daily operation. The Model 40 pumps at the right (above) have been in continuous service for about eight years. Recently during Hercules' expansion program at Parlin, Durcopumps were again specified.

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Durco Catalog 54 briefly describes Durco alloys and equipment, and lists detailed bulletins covering specific items.



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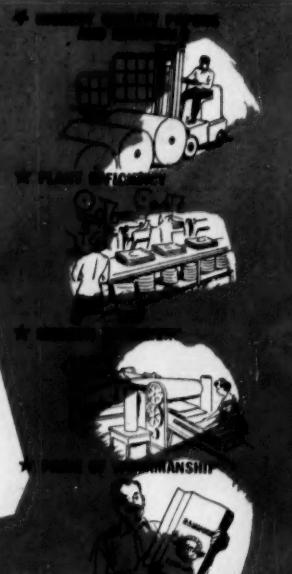


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with results that have captured the avid interest of a flock of prominent firms. Still in the experimental or "bread board" stage—so called because of the way its components are spread out on a board (see illustration, p. 74)—of development, the instrument is being eyed by a well-known chemical firm and also by an oil company (which is sizing up its potentialities for continuous process control), among others.

Briefly, the new coaxial cylinder viscometer reputedly enables the ready measurement of non-Newtonian and thixotropic liquid viscosities by establishing a substantially constant velocity gradient and shearing stress in these fluids under test. This is accomplished, explains Merrill, by two principal features of construction (see illustration, p. 72):

- A very small (0.006 in.) clearance between cylinders.
- Rigid and precise coaxial alignment of the cylinders.

The instrument boasts such other attributes as a closed pressure-feeding system to introduce test fluids; and cylinders that cannot become impeded by a rising puddle of overflow test fluid.

Other advantages resulting from the instrument's unusual design are:

- Ability to cope with a wide variety of liquids (including the very viscous), gels and pigmented fluids.
- A wide range of velocity gradients (from low to very high) to parallel real machine operation.
- Good temperature control of test fluids.
- Ease of introduction of gels and very viscous substances.
- Simplicity of operation and ease of cleaning.

Viscosities as high as 100,000 centipoises have been measured, says Merrill. The lower limit of the instrument's usefulness appears to be of the order of magnitude of 50 centipoises. Paints, varnishes, polymer dispersions and synthetic rubber solutions, among other materials, have been successfully tested with the new viscometer.

Merrill has applied for a patent on his invention, is beginning to talk to instrument companies, one of which may ultimately manufacture it on a commercial basis. Dewey and Almy, of course, is prominent in these negotiations. The Cambridge firm regards the new viscometer as an important basic contribution to rheology, is willing to let industry share in its benefits. How many stand to gain is a moot question. Destined to be costly, the device may be beyond the reach of small firms, but probably will find no

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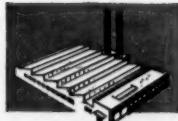
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RESEARCH

dearth of takers if it completely proves out.

What the ingenious instrument promises in the way of increasing research effectiveness may far outweigh a relatively large initial investment. By narrowing the gap between theory and practice, lab data and actual performance, the new viscometer might easily pay for itself in salvaged research time and motion.

Bigger Role for Yeast

For the by-product-conscious pulping industry, the fall of 1954 will be recalled with pride. Reason: last week, after hard months of research, Rhinelander Paper Co. of Rhinelander, Wis., reported the successful culmination of its attempts to produce yeast nucleic acid on a sound commercial basis.

Principal raw material of the process is sulfite waste liquor, which functions as a food supply for growing *Torula* yeast.

In a newly constructed addition to its pulping plant, Rhinelander raises the yeast as grist for a new method of

obtaining nucleic acid. Developed in large measure through the efforts of fine-chemicals-manufacturing Schwarz Laboratories (Mount Vernon, N.Y.), the new process unlocks a plentiful and relatively economic source of the compound.

Schwarz will sell the Rhinelander output to a spate of customers in the pharmaceutical industry and biochemical research laboratories of all kinds. Commercially, nucleic acid finds use in nutritional preparations, is a component of many tonics, geriatric pharmaceuticals, vitamin formulations and products which are reputed to increase longevity.

In fundamental research, nucleic acid is useful in studies of metabolism and certain diseases.

Although the new method is said to be a considerable improvement over previous processes (which utilize other yeast strains) for nucleic acid, Schwarz has no immediate plans for lowering cost of the product, now pegged at \$22/kilogram, in 100-gram lots (the smallest sold). If demand takes a major upswing, however, the picture might easily change.



New Atom Detector

JAMES SCHULMAN of Naval Research Laboratory (Washington, D.C.) is one man on whom the threat of atomic war has had a constructive effect. He invented a special silver-activated phosphate glass that changes color on exposure to radiation. Degree of color change, moreover, is proportional

to the amount of radiation received. The light squares (*above*) were exposed to negligible radiation, while the opaque members took heavy doses. This property is almost made to order for personal dosimeters and process radiation monitors—probable outlets for the new glass.

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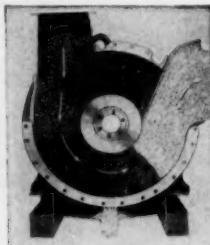
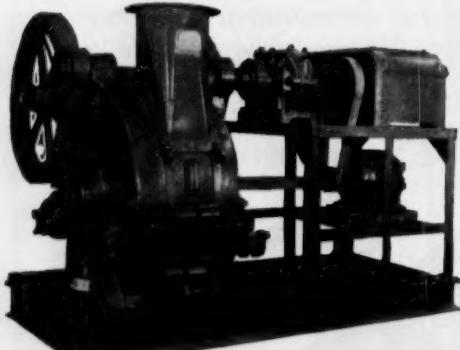
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RESEARCH . . .

New Acetylene Bonus

Two years ago, chemists of Air Reduction Chemical Co. (New York) made an unexpected finding: several of the company's acetylene glycol intermediates exhibited high surface activity. This week, industry was getting a look at two new nonionics arising from that discovery.

Labeled Surfynols 102 and 104, they're the latest of a small band of promising surface-active agents clustered around dimethyl hexynediol* and dimethyl octynediol†—the pair that gave Airco researchers the first clue to the group's unsuspected surface activity.

Heralded by Airco as an entirely new class of nonionics, these products (protected by pending patents) are made by reacting acetylene and ketones under alkaline conditions and low pressure. They are white solids, soluble in both water and organic solvents. Solubility in water decreases as their molecular weight increases.

Characteristics of the Surfynols are absence of foaming, alkali resistance, thermal stability, low odor, and considerable wetting power. Airco is quick to point out that it doesn't consider these chemical offspring a broad-gauge threat to established detergents. But the company does see them as serious competition in certain specialized uses.

It is enthusiastic in suggesting trials of 102 and 104 as nonfoaming and low-foam detergent formulations. Compounded with sodium tripolyphosphate and other standard builders, these products are said to have soil removal properties remarkably high for nonionics. A high-volume outlet might easily materialize in automatic dishwasher formulations, where these Surfynols are said to show unusually high cleansing power with no tendency to spot silver.

As paint, ink, and vinyl dispersion additives, Surfynols 102 and 104 reportedly improve flow characteristics, reduce bubble formation, improve adhesion and reduce viscosity. To prevent gelling or reduce viscosity, about 0.2-0.5% of either glycol is effective in such aqueous gum solutions as carboxymethyl-cellulose or starch. They behave similarly with polyvinyl alcohol, and shellac.

Alone, 104 gives a fast-breaking emulsion (less than one hour) of water in mineral oil, but its emulsifying power is reputedly greatly enhanced when used in conjunction with nonionics of the polyalkoxy type.

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RESEARCH

is their foam-inhibiting tendency, a real advantage in certain detergent formulations.

Secret: Airco spokesmen won't divulge the chemical identities of Surfynols 102 and 104 except to say that they are higher-molecular-weight acetylene glycols and that all four substituted groups on the molecule are aliphatic.

Of the two pioneer glycols in this series, only dimethyl octynediol has earned its number. Now called Surfynol 82, it is recommended as a component in automatic washing machine detergents and heavy-duty industrial cleaners. It has found a market in a petroleum-solvent, water-based cleaning compound for piping systems in industrial heating plants. Dimethyl hexynediol hasn't as yet earned the Surfynol tag, probably because of lower wetting power than its related glycols, is finding use as a foam-suppressant in oil-water as well as in asphalt-water systems.

Cost could be a barrier to wide-scale acceptance of the Surfynols. At a price range of 80¢ to \$1/lb. they're hardly competitive with most of the older nonionics. But Airco expects the price to drop sharply once production is up. A move of production from Bound Brook, N.J., to Calvert City, Ky., is also likely if high-volume output shapes up.

But even at current prices, the Surfynols can be used to advantage in certain detergent mixtures. Airco researchers have found that these glycols enhance the surface activity of other nonionics or cationics. This synergism effects savings, according to Airco, by reducing the total amount of detergent necessary to do a job. One example cited by the company is in the washing of melamine plastic dishes. For test purposes, melamineware was reduced to powder and the wetting time of the powder observed. A 0.5% solution of a polyoxyethylene nonionic required 10 minutes to wet the powder. This was reduced to 100 seconds by a solution of 0.25% Surfynol 104 and 0.25% of the other nonionic. The same enhancement of wetting power is shown by 104 (in conjunction with alkylaryl sulfonates).

Hard to Figure: Right now, Airco's chief problem is predicting the behavior of the new detergents. Because they differ so radically in structure from most nonionics, they must be thoroughly checked out in each potential application. Starting from scratch in each new area can be a time-consuming practice, as Airco chemists are learning.

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FFA (As Oleic)	195-204	193-202	193-202	190 Min.
Acid No.	90-96	88-95	88-93	83-90
Iodine No.	198-204	194-204	194-204	193-203
Saponification No.	1.0% Max.	3% Max.	2.5% Max.	3% Max.
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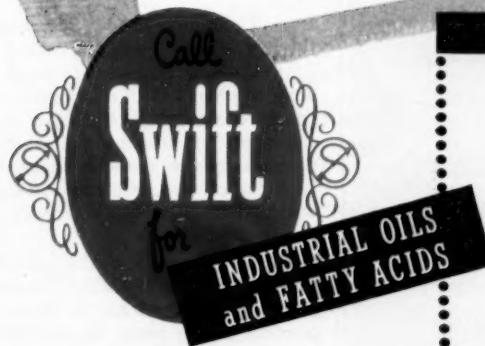
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Made from the finest raw materials available, Swift's Red Oils are produced under highly controlled conditions. A unique low temperature solvent process permits the selective extraction of color bodies and other impurities. The manufacturing control made possible by such a process is your assurance of a reliable source for a wide variety of "application pure" Red Oil products.

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RESEARCH

specific applications for the new products are clearly charted, acetylene glycols will be an easy name to remember even in the populous and tightly competitive synthetic detergents field.

Analysis Angle: Newly published by R. P. Cargille Laboratories, Inc. (New York) is a text on determination of indices of refraction of solids by microscopical methods. Called Practical Refractometry by Means of the Microscope, it's an aid to analysts working with minerals, pigments, resins, plastics, fibers, etc. Cargille points out that microscopy is the only known means of getting the index of a very small solid or translucent particle, also boosts the technique of routine testing of production batches of chemicals.

Hot Water: According to G. D. Calkins, Batelle Memorial Institute (Columbus, O.), radioactive water (labeled with tritium) has found a novel use in paint research. It's a new means of measuring moisture penetration of protective coatings. Two major paint makers contacted by CW are not now using the technique, but believe it might aid in the development of house paints.

Acetate Annex: American Viscose Corp. (Philadelphia) has established an acetate section in its research and development division at Marcus Hook, Pa.

Handy Pen: New from Palo Laboratory Supplies, Inc. (New York) is an all-purpose laboratory ball-point pen said to write with bright, opaque ink on virtually any surface—glass, metal, porcelain, paper, plastic, leather, cloth, etc. The ink is claimed to resist washing, weathering, rubbing, acids, alkalies, alcohol, autoclaving, and temperatures up to 500 C (the red ink will stand 1000 C). Markings can be removed with common solvents.

Phenol Route: Recent research at Reed College (Portland, Ore.) has blazed a new direct route from benzene to phenol. Still a laboratory synthesis, the method is based on the treatment of benzene with aqueous hydrogen peroxide and copper sulfate. In the same way, salicylic acid can be obtained from sodium benzoate.

Booming: John A. Kinckley and Associates, Chicago research consultant, has recently completed its fourth expansion in five years, by taking over new quarters. Aside from providing more working area, the move consolidates the firm's variegated activities.

PERKIN-ELMER

PROCESS ECONOMICS

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Insecticides

Insecticide Company speeds analysis of its products with infrared spectrometers. For example, only the gamma isomer of benzene hexachloride is toxic and conventional methods find it hard to distinguish it from other isomers. Infrared methods, however, can differentiate qualitatively and quantitatively among these isomers in minutes -- compared to hours by older methods. Perkin-Elmer can help you set up similar ANALYTICAL CONTROLS to speed your production.

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Ethylene Recovery and Purification is assuming increasing importance in the chemical field. Modern processing plants are well equipped with "Environmental Controllers" that maintain the process stream variables of pressure, temperature and flow-rate. Yet these instruments have no direct control over final product purity or recovery efficiency. ANALYTICAL CONTROL alone can guarantee maximum ethylene recovery and maximum ethylene purity. Perkin-Elmer TRI-NON^R analyzers are permitting more profitable operation in a number of companies today.

In chemical processing—Control Begins with Analysis. ANALYTICAL CONTROL means lower operating costs and higher profits. Perkin-Elmer

can show you how your plant can benefit from improved ANALYTICAL CONTROL in your control laboratory or on the process stream itself.

THE PERKIN-ELMER CORPORATION  820 Main Avenue, Norwalk, Connecticut

I am interested in learning how ANALYTICAL CONTROL instruments may be applied to the following processing problem: _____

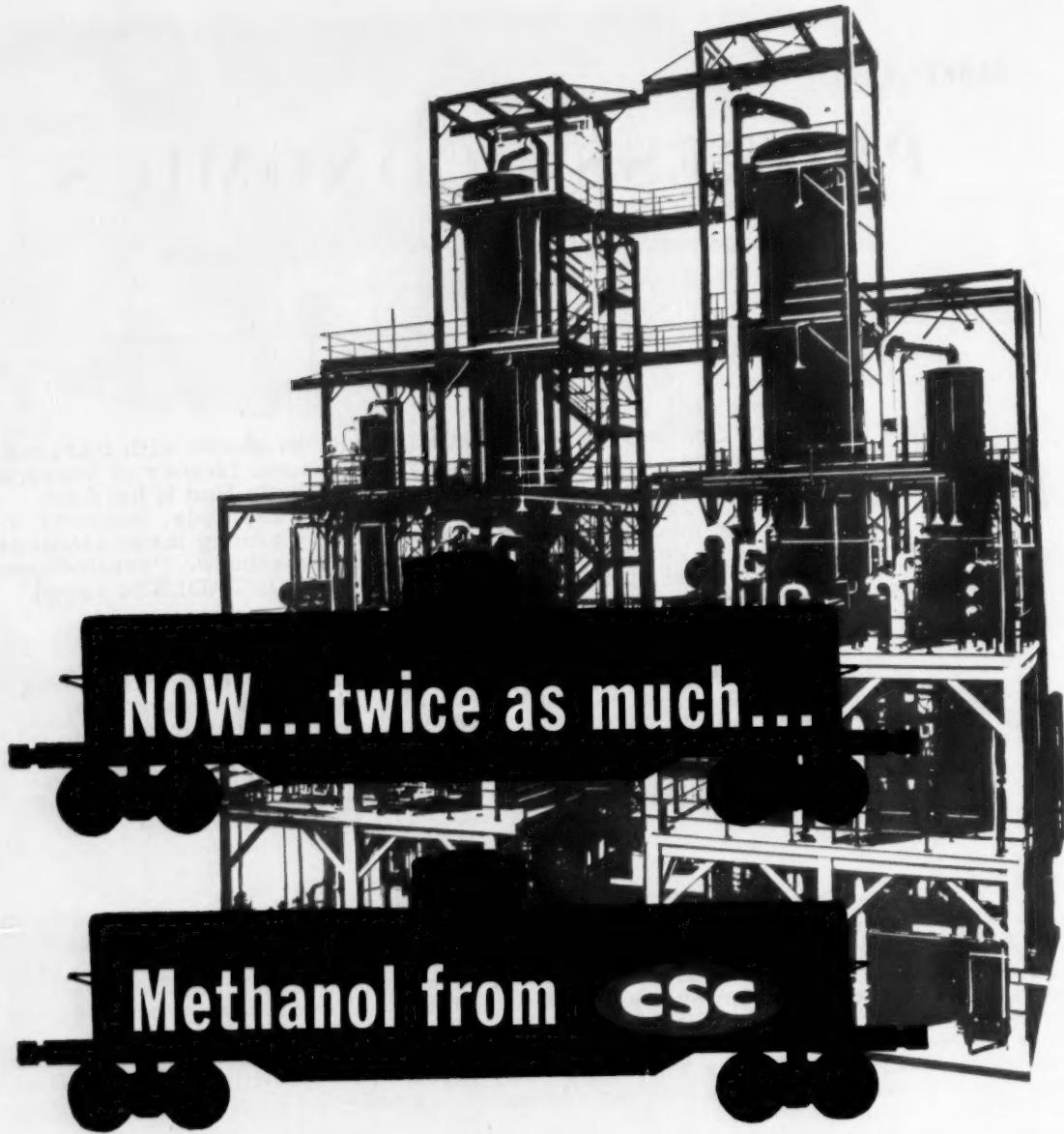
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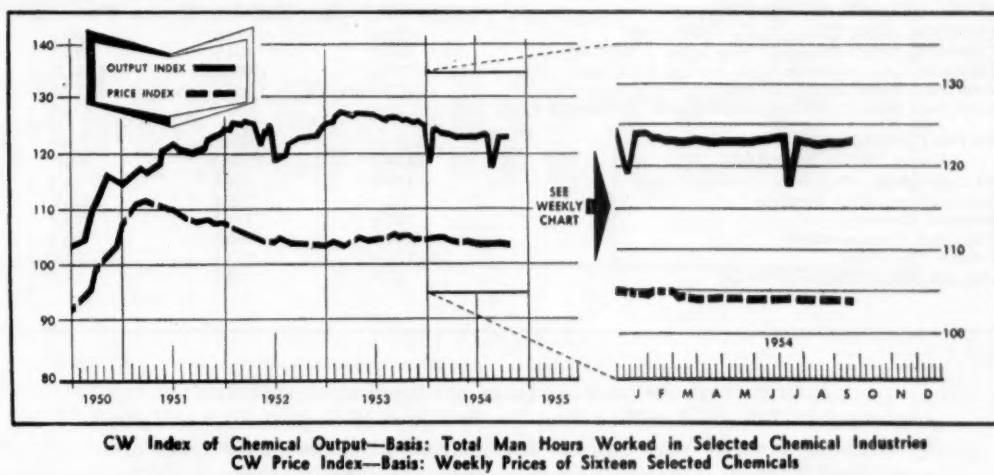
NEW YORK, N.Y.



**INDUSTRIAL
CHEMICALS**

Chemical Week • October 30, 1954

MARKETS . . .



MARKET LETTER

The word is finally out this week that coke-oven ammonium sulfate customers will not be asked to pay more for their fertilizer needs—at least not during the next seven months. Steel producers, pondering the advisability of a price change, have long been taking into account keener competition from other forms of nitrogen. The market condition (*CW Market Letter*, Oct. 16) was a factor that could have precluded any hike in sulfate tags.

The current \$42-47.50/ton (f.o.b.) prices, established last June to give early-buying users a \$2-3/ton price break, were slated to expire at the end of this week. The new posting, however, extends the same range through May 31, '55.

Actually, ammonium sulfate sales have been doing right well. Latest government figures, for instance, indicate that movement for the first eight months of this year were slightly better than for the same period in '53. The score: through Aug. '54, 1178 million lbs. vs 1953's 1176 million.

Current demand, while not bustling, is still firm enough to prevent any serious backup in supply.

There's no impending flood of chlorine in view, either. That's the way most marketers—plagued by jitters and uncertainties last spring—are today describing the chlorine market. Some of the more pessimistic sellers, however, continue to hang a long label on chlorine, note little pickup in consumer take in some areas. That, of course, jibes with the over-all consensus: demand is firm in many—but not all—sections.

Glycerine producers, though, see an upcoming improved demand from practically all users. Business has been steady until now at prices equally immune to fluctuations, but sales should take a hop when the automobile industry gets into full production of the new models. The glycerine tie-in is through paint materials used for auto finishes.

Other polyol outlets like pharmaceuticals, cellophane, explosives, cosmetics, etc., have contributed over the past weeks to the good over-all volume of sales, will likely increase during the next few months.

MARKET LETTER

WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	123.6	123.6	126.1
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.4	104.5	105.0
Bituminous Coal Production (daily average, 1,000 tons)	1,377.0	1,381.0	1,582.0
Steel Ingots Production (1,000 tons)	1,772.0 (est.)	1,769.0 (act.)	2,132.0
Stock Price Index of 13 Chemical Companies (Standard & Poor's Corp.)	326.4	330.8	256.3

MONTHLY INDICATORS—Wholesale Prices (Index 1947-1949=100)

	Latest Month	Preceding Month	Year Ago
All Commodities (Other than Farm and Foods)	114.4	114.4	114.7
Chemicals and Allied Products	106.8	106.8	106.7
Industrial Chemicals	117.4	117.4	114.3
Drugs and Pharmaceuticals	94.0	94.0	93.5
Fertilizer Materials	112.3	112.1	113.0
Oils and Fats	53.8	53.5	51.1

Indicative of the business tenor are these stock statistics: at the beginning of July, 57.4 million lbs.; the first part of August, 51.0 million; by Sept. 1, down to 49.3 million lbs. Current glycerine inventories are considered normal—a happy customer-assurance against shortages.

On the other hand, mercury continues in a tight category. But the fact that prices have stabilized over the past few weeks, at a nominal \$330/flask, may be the first hint of a market bubble-bursting. Only small lots of quality material are available, even at that fabulous tag. (Observers report that some lower-grade Mexican metal is bringing about \$5 or \$6/flask less.)

Persistent trade talk that Spanish mercury will begin hitting these shores within the next few weeks also substantiates the belief that easing of supply is imminent.

And mercurials, reflecting the level of the metal, have also been relatively steady in price.

Benzol remains comfortably perched betwixt supply and demand. Calls from consumers are fairly good, coke-oven producers aren't having too much difficulty moving most of their output. In the few areas where a surplus is evident, the oversupply isn't great enough to cause inventory problems.

That, of course, reflects the months-long reduced coking operations universally prevalent in the trade, and chances are that the picture will remain unaltered for a while despite the slight pickup in steelmaking.

Shortage of basic raw material (hydrogen), which has hampered continuous capacity operations at Atlantic Refining's new synthetic ammonia plant, has, by this week, been eliminated.

Reports are, moreover, that if plans now under consideration crystallize, there'll be more Atlantic ammonia headed for industrial and agricultural outlets sometime in the not-too-distant future.

SELECTED CHEMICAL MARKET CHANGES—Week Ending October 25, 1954

DOWN

	Change	New Price		Change	New Price
Potassium iodide, kegs, drms.	\$.25	\$1.90	Tankage, 9-11 % ammonia, bulk,		
B-Phenylethylamine, drms., wks.	.10	1.00	unit-ton	\$.25	\$7.00
			Tankage, Chicago, unit-ton	.25	7.75

All prices per pound unless quantity is stated.

DIBUTYL, DIOCTYL, TRIBUTYL and TRIHEXYL

PHOSPHITES

Less than three years ago, Virginia-Carolina Chemical Corporation introduced a big, new family of phosphites to the chemical industry. Several of these met with immediate acceptance as intermediates for a variety of new organophosphorus compounds in insecticides, textile finishing compounds, flame-proofing agents, pharmaceuticals, adhesives, lube additives, defoliant, stabilizers and plasticizers. Other members of this family with unique chemical and physical properties have not yet found commercial usage. Perhaps you may be interested in one or more of the four listed below:

	DIBUTYL PHOSPHITE	DIOCTYL PHOSPHITE	TRIBUTYL PHOSPHITE	TRIHEXYL PHOSPHITE
Formula	$(C_4H_9O)_2POH$	$(C_8H_{17}O)_2POH$	$(C_4H_9O)_3P$	$(C_{11}H_{23}O)_3P$
Molecular Weight	194.2	306.4	250.3	334.5
Boiling Point	118.9° C / 7 mm	163.4° C / 3 mm	118-21° C / 7 mm	135-41° C / 2 mm
Specific Gravity 20° / 4°	.995	.937	.925	.897
Index Refraction n_D^{20}	1.4238	1.4423	1.4327	1.4420
Flash Point, open cup	120° C	165° C	120° C	160° C
Fire Point, open cup	150° C	205° C	135° C	180° C

These neutral compounds are colorless liquids with a mild, pleasant odor and good thermal stability. They are slowly soluble in (but hydrolyzed by) water; and readily miscible with the usual organic solvents. Samples of these four phosphites and brochures are available without charge. Simply request these on your company letterhead.

Basic in Phosphorus

THE BASIC POSITION of Virginia-Carolina Chemical Corporation in phosphorus and its growing family of useful compounds is the result of nearly a century of progressive pioneering, including this country's first mining of phosphate rock in 1868 and first commercial production of phosphoric acid in 1907.

The greatest V-C growth in phosphorus has occurred in recent years. V-C phosphate mining activities have been steadily expanded and thoroughly mechanized. New V-C furnaces for producing elemental phosphorus are among the most modern now in operation.

V-C has five phosphoric acid plants and is the only manufacturer of phosphoric acids both by the

"wet process" and by phosphorus conversion. Other V-C facilities yield phosphoric anhydride, sodium orthophosphates and sodium polyphosphates, phosphatic specialties, and sodium metasilicate.

A V-C organophosphorus plant is in large scale production of alkyl phosphites, phosphonates, phosphorothioates, and other new organics. A semi-works unit is pioneering with new and highly promising chemical groupings based on phosphorus.

Enterprising research and progressive development are V-C traditions, constantly improving present products and processes, creating new products for new uses, opening new frontiers for chemical progress.

V-C Chemicals

Phosphorus, Elemental
Phosphoric Acids
Phosphoric Anhydride
Disodium Phosphate
Trisodium Phosphate
Sodium Tripolyphosphate
Tetrasodium Pyrophosphate
Dimethyl Phosphite
Diethyl Phosphite
Triethyl Phosphite†
Triisooctyl Phosphite†
Diethyl Ethylphosphonate
Tetraethyl Pyrophosphate
Sodium Metasilicate
Ferrophosphorus
Slag
Phosphorus Trichloride
Phosphorus Oxychloride
Uranium Oxide
Di- and Trialkyl† Phosphites
Phosphonates and
Diphosphonates
Phosphorothioates and
Phosphorothioites
Alkyl Aryl Phosphites
Alkyl Acid Phosphates
and other organophosphorus
compounds and phosphatic
specialties.

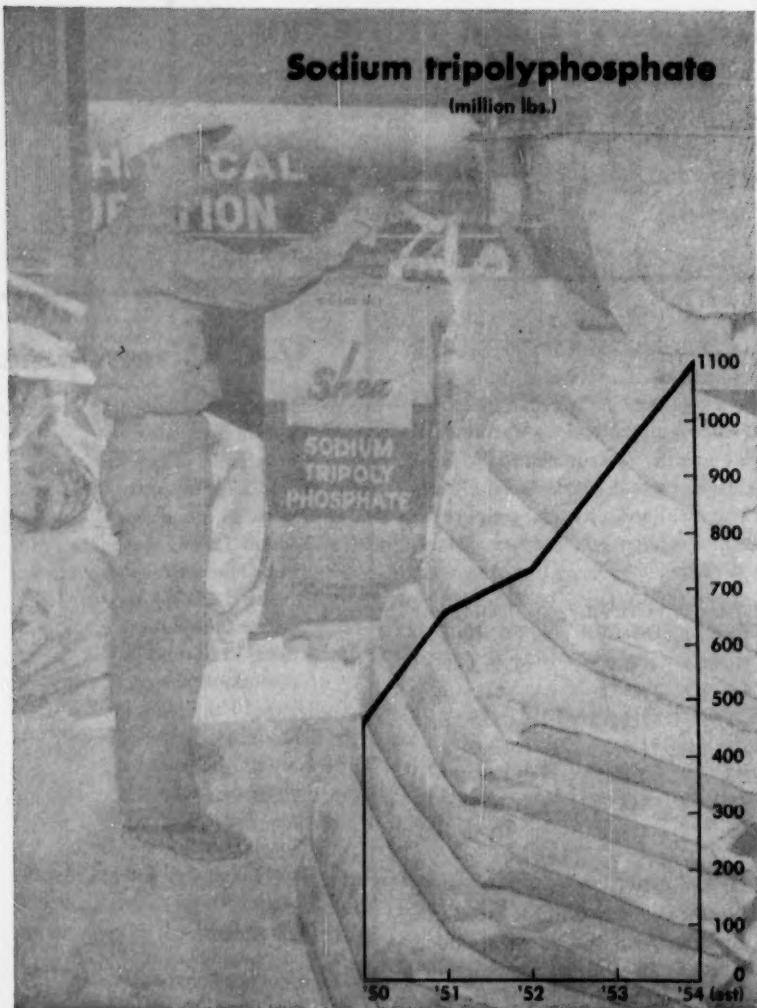
†Mfd. under U.S. Pat. 2,678,940



Virginia-Carolina Chemical Corporation also produces—V-C* Fertilizers and V-C* Superphosphates...V-C* Phosphate Rock...Vleara*, Zyon*, Wavecrete* and other zein fibers...V-C* Multiwall Paper and Textile Bags...Black Leaf* Pest Control Products...V-C* Cleaners. *Reg. U.S. Pat. Off.

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Chemicals Division: 401 EAST MAIN STREET, RICHMOND 8, VIRGINIA



Tripoly Nears a Plateau

Phosphate makers, recently faced with a market-saving problem, may well have come up with the right answer—deployment nearer to market locations. The decision, too, which intimately involves sodium tripolyphosphate and synthetic detergents, also reaffirms a staunch conviction that the two are still lusty businesses.

The expression of belief takes a two-fold tack: visibly and volubly, by the ever-growing rows of packaged synthetic detergents* on grocers' shelves; more quietly, but equally impressively, by the upturn due soon in U.S. production of some major phosphorus derivatives. Particularly slated for another

significant boost—which actually may be the last big jump—is sodium tripolyphosphate, the newest and by far the most important, in point of consumption, of all the sodium phosphates. Syndets contain roughly 40% of the latter products.

The expansions involve some diversifying moves by at least three big phosphorus producers, underlines, paradoxically, both an indicated leveling in the hitherto headlong rush to detergent use and an upcoming keener scramble for polyphosphate outlets. Virginia-Carolina and Shea Chemical are just about ready to roll into Ohio Valley polyphosphate markets; and next year, probably in the early months, Monsanto—the country's No. 1 phosphorus producer—will also begin

* Among the more prominent: Procter & Gamble's Tide, Cheer and Dreft; Colgate's Fab and Vel; Lever Bros.'s Surf and Rinso Blue; Monsanto's All.

the East.† Here are details of the recent developments:

- V-C's million-dollar plant at Fernald, O., is capable of producing more than 36,000 tons/year of phosphoric acid. Most of it will go into tripolyphosphate (at an 18-20,000-ton/year rate) and tetrasodium pyrophosphate, while the balance will be purified to food-grade acid.

- Shea Chemical, which leaped to fourth spot among the top U.S. phosphorus makers less than two years ago (CW, Feb. 7, '53, p. 20; April 3, p. 18), has begun operations at a new plant on the Ohio River at Jeffersonville, Ind. Eventually the current comparative trickle will swell to a stream of some 75-80,000 tons/year of phosphoric acid. That is destined to be converted into some 45,000 tons of sodium tripoly and sizable quantities of tetrasodium and other phosphates.

- Monsanto's move into the East, of course, typifies the phosphate makers' keen awareness that future business depends, to a great extent, on cost corner-cutting—e.g., building close to markets for freight savings. The new installation now going up at Kearny, N.J., is scheduled to make ingredients for the company's own detergent as well as for metal cleaning and cleaning compound outlets in the East. Although Monsanto describes it as a "small all-purpose phosphate plant," fact is some 50,000 tons/year of tripoly will be made there.

In the works, too, are expansions at St. Louis, among others, to up tetrasodium and tripoly output. Another Monsanto plant, being constructed at Los Angeles, is also expected to start producing phosphoric acid sometime in the first quarter of '55. Initial plans here, though, are that the acid will primarily wind up in fertilizer products. Later on, if West Coast demand warrants, detergent phosphates will likely be made.

Right now, Victor Chemical and Westvaco Div. of Food Machinery—Nos. 2 and 3 in the phosphorus parade—produce sodium tripoly in the Los Angeles marketing area. Victor, in addition to its A. R. Mass Chemical Co. Div. plant at Southgate, Calif., also has syndet builder installations at Chicago Heights, Ill., and Morrisville, Pa. At the moment the company is not contemplating building any new plants nor expanding existing facilities. While Victor is reluctant to break down tripoly production at each location, it will admit to an over-all capacity of some 200,000 tons/year.

Blockson Chemical, tops among the "wet process" phosphate makers, is

†Monsanto expects to begin operating its eighth phosphorus furnace, in December of this year, at Monsanto, Idaho.

chary about revealing pinpoint data; but four units at its sole plant at Joliet, Ill., turn out hefty amounts of both tripoly and the pyrophosphate. One estimate pegs the firm as able to cover nearly 20% of total U.S. requirements for both.

Westvaco, a relative newcomer in the field, has by now become an important factor vying for polyphosphate markets. Spaced-out plants (Newark, Calif.; Lawrence, Kan.; Carteret, N.J.) sit in some of the country's big polyphosphate consuming areas. Total tripoly capacity for Westvaco is probably in the 100,000-tons/year range.

Rounding out the leading tripolyphosphate makers is General Chemical's Claymont, Del., plant. General, one of the pioneer wet processors (which treats phosphate rock with sulfuric acid to produce phosphoric acid), makes technical-grade phosphates and polyphosphates. (Not long ago General considered buying ready-built pyrolytic facilities for the production of phosphorus-derived products, decided instead to remain a major factor in a local market rather than enter the national detergent builder arena.)

Fortune-Soaring: Sodium tripolyphosphate, first introduced in the early '40s, had little commercial impact until the sudden explosive acceptance of synthetic detergents some five years later. Then, as the preferred builder for the new household cleaning aids, tripoly's fortune became tied inextricably to the syndet boom. Its growth curve almost parallels the dramatic climb in solid synthetic detergents.

U.S. Production

(million lbs.)

	Sodium tripolyphosphate	Solid Detergents
1949	183.0	702.0
1950	466.0	1,071.0
1951	663.0	1,217.0
1952	741.0	1,481.0
1953	936.0	1,756.0

The synthetics continue to be favored over soap by the consuming public. Indicative of the trend is the slow decline of soap sales due to replacement by syndets. For example, latest American Soap and Glycerine figures give the latter nearly 58.5% of the total soap and detergent market.

More than one observer, however, is beginning to feel that the synthetics, having pushed soap that far, may be in for a leveling. Reason: the hard-water areas of the country (where syndets obviously have the edge) are just about covered. Aside from normal population-growth increase, any future jack-rabbit leaps in consumption will have to come from soft-water cus-

tomers—and soap may well continue to hang on to the consumers' preference.

Translated into tripolyphosphate prospects, the syndet-shying could presage a concomitant flattening of the use curve, perhaps at a slightly better than 1 billion lbs./year level—for the bulk of tripoly continues to head toward detergents. (Last year, for instance, of the 936 million lbs. produced, more than 700 million is estimated to have been used in them.)

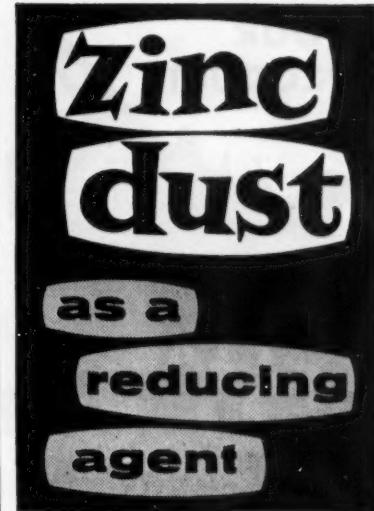
Despite the drop in soap sales in the past, however, another phosphate, sodium pyro—used chiefly in cleaning applications as a soap builder and in industrial cleaning compounds—manages to hold up its annual tonnage. It has been used in synthetic detergents, but other applications have been responsible for its small rise. Currently, production averages some 8-10,000 tons/month, will likely do better this year than 1953's approximate 95,000 tons. And the figure last year was 9-10,000 tons more than was turned out the previous year.

Tetra, along with sodium acid pyrophosphate, has wide application as a deflocculant in the treatment of drilling muds for oil wells. It's also used in solubilizing certain types of dyes as well as for removing waxes, dirt and other foreign matter from textiles before they're bleached or dyed. More specialized outlets include electroplating, pharmaceutical and cheese processing.

Phosphoric Flood: The recent and anticipated increases in phosphorus production, of course, are directly evident in phosphoric acid output. Perhaps 95% of the available phosphorus finally emerges as acid. At the moment, U.S. phosphorus producers could turn out well over 300,000 tons/year.

Actually, though, production is running considerably behind total capacity. During the first six months of this year it's estimated that not more than 138,000 tons was produced. If past performance is any criterion, output for the last half of '54 will total perhaps 120,000. Thus, a safe guess of the total for the year is some 250-260,000 tons.

Excluding TVA's approximate 30,000 tons (because its production doesn't get into industrial markets), but including American Agricultural and Oldbury Electro-Chemical, in addition to the firms mentioned elsewhere, the resulting 220,000 tons or so of phosphorus filters—via phosphoric acid—into industrial uses about like this: 65% to the sodium phosphates; 15% consumed as acid; some 13% to calcium phosphates; and the balance, about 6 or 7%, to others, such



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2. Works in alkaline and acidic solutions of varying pH; also in aqueous and alcoholic solutions.
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Produced under rigid physical and chemical control, Federated Zinc Dust has 97.0% minimum metallic zinc content; iron content .01%, lead .20% maximum. It will all pass through a 100 mesh screen; 97.0% through a 325 mesh screen.

Free Sample

You can have a free half-pint sample of Federated Zinc Dust for testing as a reducing agent. Just write on your company letterhead to Dept. CW at address below. Investigate it, too, as a catalyst and as a polymerizer.

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M A R K E T S

as the ammonium phosphates and phosphorus chlorides.

But the phosphoric acid flood is more than doubled when the amount made from phosphate rock is added to the elemental phosphorus-derived material. Fact is while last year both were running neck-and-neck, the wet processors have so far this year pulled slightly ahead of furnace operators. The race, if that's what it is, highlights the growing competition between the two types, with the wet-process makers actually moving into fields once considered exclusively elemental domains.

The battle for feed-grade dicalcium phosphate markets is a good example of the current, hotter-growing rivalry. As recently as 1951, furnace phosphorus and gelatin by-product operations accounted for practically all of the feed-grade dical offered for sale. Within the next year or two, the capacity breakdown will likely change radically (see table):

Estimated Feed-Grade Dicalcium Phosphate (in tons)

Furnace	195,000
Wet process	155,000
Gelatin by-product	15,000
Total	365,000

Considering that many experts expect dical phosphate consumption to have a difficult time hitting 300,000 tons in the foreseeable future, it looks as if output will easily pace sales for some time to come despite the fast-growing use as a mineral supplement in animal foods.

Tripoly Cynosure: While there's some rough elbowing in other phosphate fields, the projected developments in sodium tripolyphosphate are fixing the attention of most marketers. For the expansions and shifts closer to markets may be described as defensive moves—lining up of ammunition for a brewing battle for customers among the synthetic detergent makers.



A Honeycomb Market

PHENOLIC resins, aluminum and kraft paper combine to open up what may well become a booming market for all three—a new rigid lightweight panel for buildings. A typical roof panel, for example, 3 in. thick, measuring 4x14 ft., weighs only 75 lbs. The honeycomb core

(see cut) is said to provide full insulation with at least 30% better resistance to outside weather than conventionally built walls. Kraft paper, impregnated with the resins, is sandwiched between thin aluminum sheet facings. The phenolics resist moisture, mould, fungus, etc.



How "Dutch Boy" Chemicals help **the petroleum industry** put more life into heavy-duty lubricants

How can you make heavy-duty lubricants longer-lived?

How can you fortify them against today's increasing speeds? . . . Today's higher temperatures? . . . Today's higher pressures? Against atmosphere, steam, water, dust, too?

Some time ago, National Lead put these questions up to its researchers. And, in due course, these researchers came up with the answer: new Dutch Boy Bentone 34.

This new "Dutch Boy" development is a non-soap gelling agent. It gives oils and greases tougher bodies to withstand higher speeds and pressures. Bentone 34 prevents thin-out at high temperatures, helps lubricants stay put. It increases resistance to water, steam, adverse atmospheres. It reduces harm from dust.

Helps other industries, too.

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DISASSEMBLY: Cleanliness is the aim; detergents ease the chore.

Help for the Dairies

Looks like \$25 million in sales this year for specialized dairy cleaners and sanitizing compounds.

"In-place cleaning," catching on in more dairies, is saving money for the milk processor, hiking the market for specialty cleaners.

This week, upwards of 25,000 people are milling through Atlantic City's vast Convention Hall. It's the biennial show of the Dairy Industry Supply Assn., and getting plenty of attention are the new detergents and Sanitizers, equipment and techniques to keep dairy processing equipment germfree and clean.

That the specialty cleaning compounds have a vital job in the dairy industry is apparent from their sales. Current estimates are that \$20-25 million worth will be sold in '54, and that the dairying trend toward "in-place cleaning" is going to boost that figure.

Already the dairies have proved lucrative markets for formulators of special cleaners, including Cowles Chemical Co. (Cleveland), The Diversy Corp. (Chicago), Klenzade Products, Inc. (Beloit, Wis.) and Oakite Products, Inc. (New York). And basic chemical makers like Diamond Alkali, Dow, Pennsalt, Solvay and Wyanotte, too, have found the milk proc-

essors big outlets for their chemicals and special formulations.

No Take Down: Much as the dairy industry has meant to these firms, they have received plenty of help in return. Modern detergent formulations have made it possible for dairies to adopt new techniques of in-place cleaning—where formerly the extensive piping, cooling, and pasteurizing equipment had to be dismantled after each run, it can now be effectively and efficiently cleaned in place.

Just recently, the advantages* of such cleaning procedures persuaded the U.S. Public Health Service to include the methods in its Health Service Code. Some of these pluses:

- Cleanup labor costs are cut 25%.
- Damage to expensive pipes (in dismantling) is eliminated.
- Danger of recontamination of lines left disassembled on racks is lowered.

* In many cases, equipment must be redesigned for in-place cleaning—to provide recirculating systems, steeper line slopes, etc.

These advantages are important to the dairies, where some five out of every eight working hours is spent in scrubbing up equipment for the next run. (Of that cleanup time, nearly 40% is consumed in assembly and disassembly of the lines.)

Double Duty: Broadly speaking, dairy cleanup products are of two types: those that visibly clean—synthetic detergents and water are most common;* and those that invisibly clean—sterilizing and sanitizing compounds.

For the scrubbing up, both acidic and alkaline compounds are used. The alkaline types—made with caustic soda, soda ash, trisodium phosphate, sodium metasilicates, along with emulsifying and suspending agents, and water conditioners—are needed to remove dried milk films.

To remove mineral salt deposits, acidic agents and wetting agents are combined in a liquid cleaner to penetrate the burned-on (by the pasteurizing process) milk deposits.

Water, too, plays a big part in formulation of the dairy detergent. If it is hard, it causes water spotting, film, and "milkstone" (a deposit of insoluble salts combined with casein precipitated from milk by heat). To lick problems of milkstone and scale, complex polyphosphates—sodium tripolyphosphate seems most popular—and organic sequestering agents are commonly used. One of the recently tried sequestering agents is sodium gluconate, incorporated in bottle washing alkalies.

Antigerm: Still dominant as bacteriostats in dairies are the chlorine-releasing compounds, chiefly sodium hypochlorite. Quaternary ammonium compounds are giving them stiff competition. (In a survey made by Borden, covering some 3500 dairies, it turned out that roughly one-third are using the "quats.")

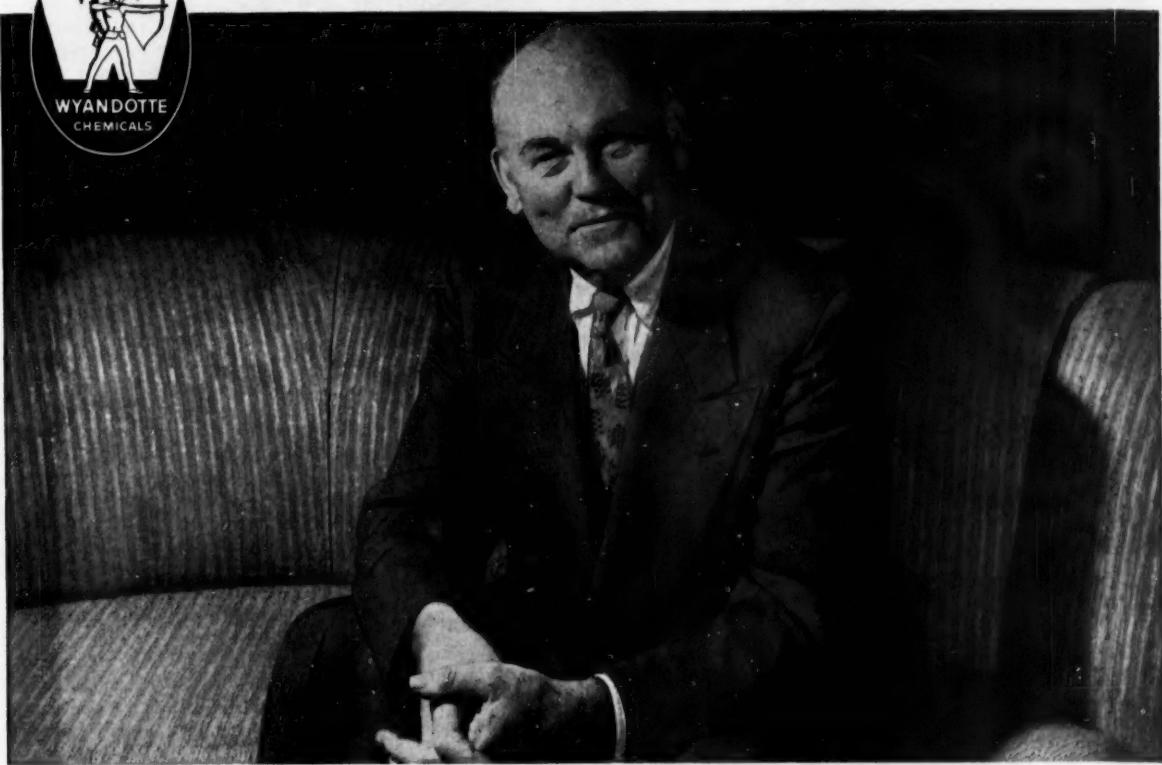
A particular problem in disinfecting equipment is destroying psychrophiles, or "cold-loving" bacteria, which grow readily at 40 F or lower. They, and coliform bacteria, enter milk after pasteurization, either from improperly cleaned equipment or from the water supply. Use of good detergents and sanitization agents can eliminate most of this trouble, but dairies are seeking even better products.

Making sure that dairy owners keep

* Soap is only a minor item in most dairies. Its incompatibility (milk has much the same effect on soap as does very hard water) has led some health departments to prohibit its use for cleaning equipment.



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bacteria count down are city, state and federal health officials. A manager of a plant must be prepared for them any day in the week, any hour. If the milk tested does not come up to minimum standards, there's not likely to be any fine—though they're suggested in the Health Service Code. A more effective penalty: to downgrade the milk (say, from Certified, A, B, or C) to a lower category (usually anything under A). That usually restricts sales to industrial buyers.

Pasture to Pasteurized: From the moment milk leaves a healthy cow until it is consumed, in every container from the milking machine to the delivery bottle, it must be protected from contamination. The dump tanks, flow lines, hold tanks, surface coolers, pasteurizers, pumps and fillers all must be spotlessly maintained.

In the expensive chore of keeping them clean, chemicals make up but 5%. But that small percentage pyramids into a sizable total specialty business.

Down to Cases

The Food & Drug Administration is getting down to cases of tolerances with the Miller amendment (CW Newsletter, Oct. 23). The Oct. 20 issue of the *Federal Register* includes tentative maximum residues for some 40 pesticides.

It is "zero tolerance" for nine types of pesticides: calcium cyanide; dini-

* From an estimate by Cowles Chemical Co.

tro-o-sec, butyl phenol; dinitro-o-cresol; HEPT; TEPP; hydrocyanic acid, and mercury-, nicotine-, and selenium-containing compounds.

There are 28 pesticides that may be present, and the levels to which they will be allowed are:

- Up to 14 parts per million of methoxychlor. (Crops to which these values apply are given in the *Register*.)
- Up to 7 ppm. of DDT, Ferbam fluorine compounds (on F basis) lead arsenate (for some uses, its maximum is 1 ppm.), phenothiazine, TDE, oxaphene, zineb, and ziram.
- Up to 5 ppm. of BHC, 2,4-D, Crag 341.
- Up to 3.5 ppm. arsenates and tarter emetic.
- Up to 3 ppm. EPN.
- Up to 1 ppm. of parathion, naphthalene acetic acid the dicyclohexylamine salt of dinitro-o-hexylphenol.
- Up to 0.1 ppm. of aldrin, chlordane, heptachlor and dieldrin.

Some products are tentatively exempted from tolerances. If properly used, and not at the time of or after harvest, common copper compounds (except the arsenate), petroleum oils, pyrethrum and rotenone and their synergists, ryania and sabadilla are in this category.

Nothing Definite: These tolerances are, however, still strictly tentative and are based on the 1950 hearings on pesticide residues. If manufacturers feel there is newer data that should be considered, they have up to

60 days to send their written comments to the Food & Drug Administration. (Otherwise, at that time the regulations will be made final.)

Included among the proposals is one to establish a \$500 fee for setting a new tolerance, and a \$140 fee for extending tolerance to additional crops.

Barring extensive industry disagreement over these tentatively set tolerances, they should be firmly established in time for the next big growing season.

Plain Talk

One way—perhaps the best way—to avoid trouble with consumers who use your products (CW, Oct. 23, p. 20) is to make sure they know how to use them—properly. And just last month, California Spray Chemical Co. sought to improve indirectly the safe handling of agricultural chemicals by helping federal and state authorities set up educational programs on pesticide safety.

First point in Cal-Spray's plan was the mailing of 12,730 letters to area officials, universities, extension services and others. These letters (which cost Cal-Spray \$2500) offer—and seek—help in preventing accidents, blame for which it lays to four main causes:

- Leaving hazardous material exposed to children and irresponsible persons.
- Failure to read and follow the precautions on the labels.
- Carelessness in the disposal of empty containers.
- Careless use of weed killers and defoliants.

Along with suggestions for bulletins and releases that concern pesticides, the letter included a reprint from a Cal-Spray internal publication, its "Ortho Cal-Spray Research News," listing complete data on antidotes for common pesticides.

Response to the program so far has been good. Some 147 repliers said that they already had educational programs, and would incorporate in them some of Cal-Spray's ideas. Some 54 repliers stated that the recipient would adopt such a program as soon as possible. And hundreds of others expressed approval of the mailing.

The whole idea points up agricultural chemical firms' increasing awareness of their responsibilities in improving pesticide safety. And cooperative efforts such as those promulgated by Cal-Spray can accomplish much in overcoming many still-existing uncertainties about the best positive steps for safety.

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Reply P 4117, Chemical Week
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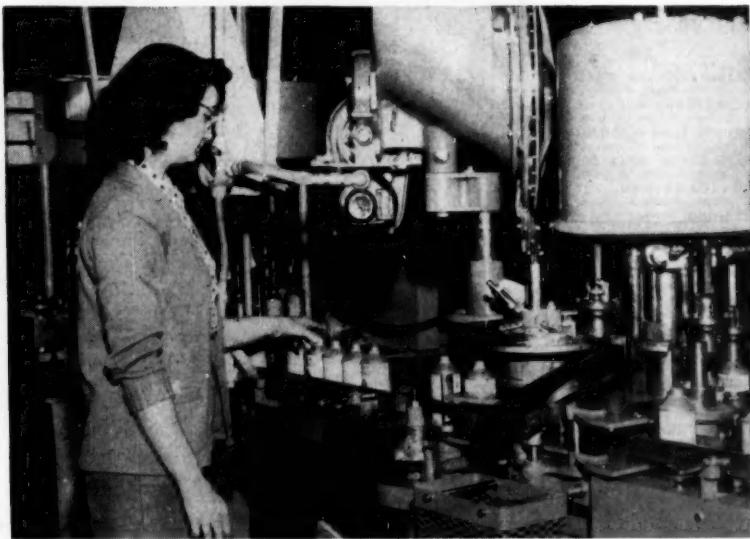
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NEW LINE: For more automotive specialties, Permatex builds a Kansas City plant.

Big Step Westward

As the biggest step yet in its expansion program, Permatex Co. Inc. (Brooklyn) last week formally opened its new plant in Kansas City, Kan. In the \$500,000 brick structure are mixing and packaging facilities—as well as warehouse and office space—enough to double current Permatex output.

The new plant, first out-of-Brooklyn manufacturing facilities for the company in its 45-year history, is only part of the firm's '54 plans. It has earmarked \$750,000 for improving plant and distribution this year. And the way Permatex' President C. A. (Pete) Benoit, Jr., sees it, expansion is just getting under way.

He predicts a 100% expansion in sales in the next 10 years, and at the official dedication, put his predictions for his firm in a special vault, along with the prognostications of spokesmen for various phases of industry. The sealed vault will be opened in 1964.

Manufacturing Community: The new plant is located on a 3-acre plot in Kansas City's Fairfax district, a fairly new industrial development. It is of two-level construction, air-conditioned throughout, and is designed for gravity-flow production of the specialty compounds. An underground tank farm provides storage capacity for 60,000 gal. of raw materials.

Personnel for the plant will be drawn largely from the Kansas City area—only some supervisory people headed by William Hean, general

manager, will transfer from the home plant.

Permatex, best known for its first product, an engine sealing compound called Form-A-Gasket, produces a number of other engine sealers, and such specialties as cleaner-polishes, rust solvents, hydraulic brake fluids, and valve grinding compounds.

Tarnish Preventer: Welmaid Mfg. Corp. (Chicago) has a new aerosol called Pro-Tex-Sil. A tarnish preventer for silver, it's claimed to get into cracks and crevices. A 6-oz. size retails for \$1.50.

Anti-Onion: Mother's Remedies Corp. (Chicago) markets a liquid to rub into hands to kill odors of onions, bacon, fish and dishwater. Name: No-Scent. A 4-oz. bottle costs \$1.

Clean Solution: White House Chemical Products Co. (Chicago) is selling a new product for cleaning painted walls, woodwork, floors. A 2-lb. can sells for \$1, makes 40 qts. of solution. Tradename: White House Cleaner.

Gel Paint: Hammond Co. (Hammond, Ind.) currently offers a dripless-type paint called Breeze that's a washable flat. It's available in six colors, retails for \$5.35/gal.

Curl Prolonger: Louell Products (Brooklyn) now sells New No-Time, a lotion hair dryer that's aerosol pack-

aged. When sprayed on wet hair, it is said to dry and condition hair, make curls last longer. Price: \$1.35.

No Pour: Nitroparaffins might have more applications in reaction engines if gelled—that looks like the idea behind Herman Maisner's new patent (U.S. Pat. 2,690,964) assigned to Aerojet-General Corp. His method to make the gels: use 10-50% nitrocellulose, 50-90% nitromethane, and a sensitizer (aniline, diphenylethylenediamine, diethylamine, or tetraethylene pentamine).

Stalk Talk: Celery growers are taking a look at a formulation to eliminate weeds from their celery plots. Robert Emond and Francis Moffat worked out the plan for Standard Oil Development (U.S. Pat. 2,690,965). It makes use of an oil-in-water emulsion (oil, 60-30% by volume) maintained by an oil-soluble emulsifying agent (1-5%). The oil has a 300-400 F boiling range, is 8-24% aromatic, and 41-94% naphthenic. 20-100 gals./acre of the emulsion are used.

Literary Adhesive: Henry Funk and Marquis Reger have devised a new way to bind books (U.S. Pat. 2,690,981, assigned to Du Pont). Basis of the method is a fabric impregnated with a mixture of polyvinyl chloride (27.1% by weight), tricresyl phosphate (10.4%), liquid polyalpha methylstyrene (76%), pigment (51.3%), and polyvinyl acetate (3.6%).

Rust Chaser: Rust can be removed from auto bumpers, or other chromium plated parts, like this: The rusted portion is moistened with water, then treated with a powder of polycalcium silicate and aluminate. After it has been permitted to stand for a few minutes, the powder is rubbed off with a cloth, and the surface dried. The process is described in U.S. Pat. 2,690,983, granted to Joseph Meckler and Maurice Meckler, and assigned to the Kromite Products Co. (Bedford, O.).

Silver Saver: One way to reduce corrosive effects of sulfur-containing lubricants on silver is to add an inhibitor like a 1,3,4-thiadiazolyl-2,5-bis (diethyl dithiocarbamate). It's a procedure (U.S. Pat. 2,690,999) worked out by Warren Lowe and James Clayton, and assigned to California Research Corp. (San Francisco).

Country Wide: Glidden Co. has finally taken the wraps off its polyvinyl acetate-based paint for masonry and

CHEMICAL WEEK • ADVERTISERS INDEX

OCTOBER 30, 1954

ALUMINUM LIMITED SALES, INC.	87	OLIN-MATHESON CHEMICAL CORP.	63
Agency—J. Walter Thompson Co.		Agency—Doyle, Kitchen & McCormick, Inc.	
AMERICAN AGRICULTURAL CHEMICAL CO., THE	15	Agency—Walker & Downing Adv.	702
Agency—Cowan & Dengler, Inc.		Agency—Fred Wittner Adv.	
ATLAS POWDER CO.	39	PERKIN-ELMER CORP., THE	85
Agency—The Aitken-Kynett Co.		Agency—Walker & Downing Adv.	
BALTIMORE & OHIO RAILROAD	70	PITTSBURGH COKE & CHEMICAL CO.	82
Agency—The Richard A. Foley Adv. Agency		Agency—Walker & Downing Adv.	
BIOS LABORATORIES, INC.	74	QUAKER OATS CO., THE CHEMICAL DIV.	3
Agency—Firestone Adv. Agency		Agency—Roger & Smith Adv.	
BUFFALO ELECTRO-CHEMICAL CO.	87	REFINED PRODUCTS CORP.	46
Agency—John Mather Lupton Co.		Agency—James Civille Adv.	
CARBIDE & CARBON CHEMICALS CO., A DIV. OF UNION CARBIDE & CARBON CORP.	31, T80	REPUBLIC CHEMICAL CORP.	782
Agency—J. M. Mathes, Inc.		Agency—Albert Frank-Guenther Law Adv.	
DARLON, INC., G. O.	30	SCHUTZ-Z-ONEILL CO.	Third Cover
Agency—Folts-Wessinger, Inc.		Agency—Foulié Agency, Inc.	
CELANESE CORP. OF AMERICA	41	SCIENTIFIC DESIGN CO.	65
Agency—Ellington & Co., Inc.		Agency—Michel-Cather, Inc.	
CHEMICAL CONSTRUCTION CORP.	68	SEABOARD SHIPPING CORP.	870
Agency—Michel Cather, Inc.		Agency—Wendell P. Colton Co.	
CHEMICAL ENGINEERING	42, 43	SHELL CHEMICAL CORP.	Second Cover
Agency—Sterling Adv. Agency		Agency—J. Walter Thompson Co.	
CHEMICAL MANUFACTURING CO.	84	SHERWOOD REFINING CO.	778
Agency—Fuller & Smith & Ross, Inc.		STAUFFER CHEMICAL CO.	55
CHEMICAL SOLVENTS, INC., THE C. P.	878	Agency—J. Hayden Twiss Adv.	
COMMERCIAL SOLVENTS CORP.	86	ULTRA CHEMICAL WORKS, INC.	81
Agency—Fuller & Smith & Ross, Inc.		Agency—B. H. Leon Co., Inc.	
CORN PRODUCTS REFINING CORP.	18	UNION CARBIDE & CARBON CORP., CARBIDE & CARBON CHEMICALS CO.	31, T80
Agency—J. Hayden Twiss Adv.		Agency—J. M. Mathes, Inc.	
DAVENPORT MACHINE & FOUNDRY CO.	880	U.S. RUBBER CO.	57
Agency—Bawden Bros., Inc.		Agency—Fletcher D. Richards Inc.	
DAVISON CHEMICAL CO., DIV. OF W. R. GRACE & CO.	21	U.S. STEEL CORP., COAL CHEMICALS DIV.	2
Agency—W. George & Keyes, Inc.		Agency—Batten, Barton, Durstine & Osborn, Inc.	
DU PONT DE NEMOURS & CO., INC., E. I., ORGANIC CHEMICALS DEPT.	71	U.S. TESTING CO., INC.	28
Agency—Batten, Barton, Durstine & Osborn, Inc.		Agency—Robert B. Grady Co., Inc.	
DURIRON CO., THE	75	VICTOR CHEMICAL WORKS	4, 5
Agency—Kircher, Helton & Collett, Inc.		Agency—Russel M. Seeds Co.	
EASTMAN CHEMICAL PRODUCTS, INC.	59	VIRGINIA-CAROLINA CHEMICAL CORP.	89
Agency—Kenyon & Eckhardt, Inc.		Agency—Albert Bidney Noble Adv.	
EASTERN STATES PETROLEUM CO., INC.	27	WESTINGHOUSE ELECTRIC CORP.	47-54
Agency—Rutherford & Ryan, Inc.		Agency—Fuller & Smith & Ross, Inc.	
EIMCO CORP., THE	20	WYANDOTTE CHEMICALS CORP.	85
Agency—Maisie Co.		Agency—Brooke, Smith, French & Dorrance, Inc.	
ESSO STANDARD OIL CO.	29		
Agency—McCann-Erickson, Inc.			
FEDERATED METALS DIV., AMERICAN SMELTING & REFINING CO.	91		
Agency—John Mather Lupton Co.			
FERGUSON CO., THE H. K.	60		
Agency—The Bayless-Kerr Co.			
FILTRATION ENGINEERS, INC.	66		
Agency—W. L. Towne Adv.			
FOSTER WHEELER CORP.	81		
Agency—Rickard & Co.			
GIRDLER CO., THE	25		
Agency—Griswold-Eshleman Co.			
GLYCERINE PRODUCERS ASSOC.	79		
Agency—G. M. Basford Co.			
GOODYEAR TIRE & RUBBER CO.	1		
Agency—Kudner Agency, Inc.			
GRACE CHEMICAL CO.	19		
Agency—G. M. Basford Co.			
HADLEY BROS.—UHL CO.	874		
Agency—Whitehead & Bragge Inc.			
HAMMOND BAG & PAPER CO.	78		
Agency—Walker & Downing Co.			
HARDESBY CO., W. C.	782		
Agency—J. Hayden Twiss Adv.			
HARSHAW CHEMICAL CO., THE	77		
Agency—Fuller & Smith & Ross, Inc.			
HERCULES POWDER CO.	7		
Agency—Bommer-Davis, Inc.			
HEYDEN CHEMICAL CORP.	Back Cover		
Agency—Bommer-Davis, Inc.			
HINDE & DAUCH PAPER CO.	56		
Agency—Howard Swink Adv. Agency, Inc.			
INTERNATIONAL MINERALS & CHEMICAL CORP.	45		
Agency—C. Franklin Brown, Inc.			
KELLOGG CO., THE M. W.	73		
Agency—Gordon Baird Assoc., Inc.			
McGRAW-HILL BOOK CO.	84		
Agency—Ellington & Co., Inc.			
MARINE TRANSPORT LINES	24		
MATHISON CHEMICAL CORP.	63		
Agency—Doyle, Kitchen & McCormick Adv.			
MERCHANTS CHEMICAL CO., INC.	97		
Agency—Sterling Adv. Agency			
METAL HYDRIDES, INC.	58		
Agency—Cramer-Trowbridge Co.			
MISSOURI DIVISION OF RESOURCES & DEVELOPMENT	22		
Agency—Oakleigh R. French & Assoc.			
MUTUAL CHEMICAL CO. OF AMERICA	8		
Agency—J. Hayden Twiss Adv.			
NATIONAL LEAD CO., THE	93		
Agency—Marschall & Pratt Co., Inc.			
NICKEL PLATE ROAD	88		
Agency—Fuller & Smith & Ross, Inc.			
NITROGEN DIV., ALLIED CHEMICAL & DYE CORP.	23		
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SPECIALTIES . . .

asbestos shingle homes. Introduced last week, the new paint, Glide-On, is the first PVAc paint for outside use that is one of the "Big 10" of the paint industry has sold generally, although such paints have been marketed for a number of years (CW, Nov. 14, '53).

Inside Job: While Glidden is kicking off its PVAc paint for exteriors, Sherwin-Williams is launching a new interior primer-sealer based on the resin. It is tagged Paintercraft P.V.A. Fast-Dri Wall Primer and Sealer. It is said to dry in two hours, and can be immediately recoated.

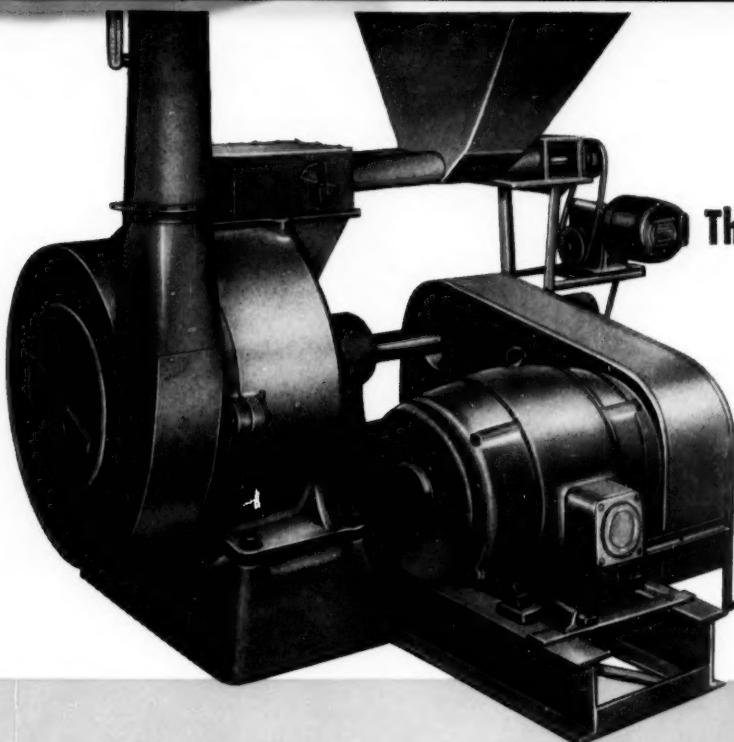
No Prescription: First of the "prescription" motion-sickness remedies to be put on the nonprescription list is Burroughs Wellcome & Co.'s Marezine. The antihistamine product, cyclizine hydrochloride, is said to relieve motion sickness symptoms, without making the user drowsy. It will be sold in packages of 10 for 65¢.

For some time, the better known motion sickness products have been passed out quite freely by airline and steamship medical departments to their firms' passengers. But anyone who decided to provide his own had to get a prescription. Currently, several other makers of the remedies (CW, Jan. 2, p. 46) are seeking to get the Food & Drug Administration to take their products off the prescription list, too.

General Purpose: Insecticide formulators in the U.S. are looking over a new all-purpose emulsifier for liquid pesticide formulations. It's Toximul 500, and is made by Ninol Laboratories (Chicago). It is a blend of special anionic and nonionic surface-active agents, and is claimed to lower the interfacial tension between the emulsifiable oil and water to the point where there is spontaneous emulsification.

Fine Stuff: New, fine-grade molybdenum disulfide powder has been marketed by the Alpha Corp. (Stamford, Conn.). The new material has an average particle size of less than one micron—less than a fiftieth of the particle size in many standard products.

Coast Jump: O'Brien Corp. (South Bend, Ind.), Indiana paint manufacturer, has just bought Garrett M. Goldberg Paint Co., San Francisco, which it will operate as a division. The Coast acquisition gives O'Brien national distribution and manufacturing facilities for the first time.



The new *Superfine*
SCHUTZ-O'NEILL
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60 YEARS
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AIR FORCE PULVERIZING—AIR CLASSIFICATION

Here is a proven, automatic and dustless method of pulverizing any grindable material to your desired fineness. For extremely fine grinding and uniform particle size distribution of product, the principle of centrifugal impact with air attrition utilized so efficiently by the Schutz-O'Neill "Superfine" Pulverizer has never been surpassed. The centrifugal force recirculates coarse particles within the mill for regrinding. The air classification carries the fine particles out of mill as uniform product of the desired particle size.

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Ten minutes is all you need to take apart a Schutz-O'Neill "Superfine" for cleaning, to adjust for fineness, or replace any part. Remove 2 pins and cone housing lifts off. Loosen 1 set screw and 1 nut and all other parts slide right off the center shaft. It is unmatched for accessibility and simple, rugged design.

LET SCHUTZ-O'NEILL GRIND A TEST SAMPLE FOR YOU

Send us a 50 lb. stock sample stating what your material is and fineness desired. You will receive your pulverized stock plus our engineering report giving complete details of process used together with recommended equipment, methods and mill plans.

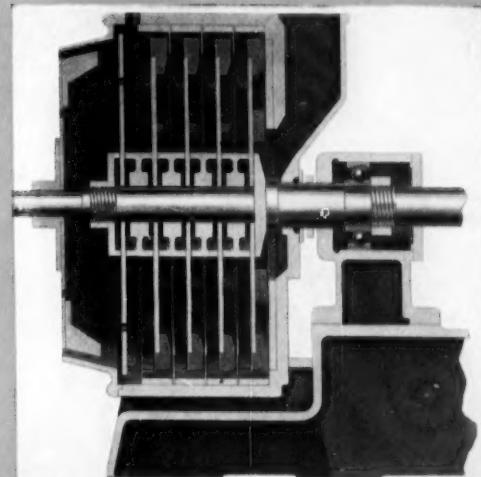
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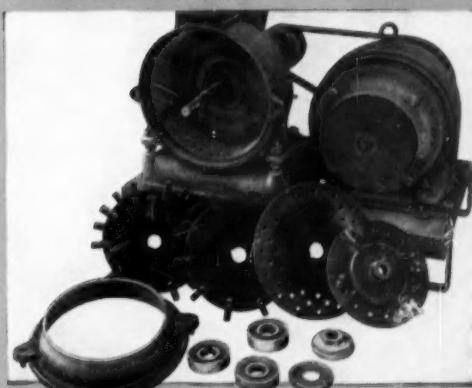
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Cross section of the grinding chamber of our "Superfine" Pulverizer showing from left to right the cone plate, perforated mill plate and 4 beater plates with multi-section liner divided by annular rings.



Here is a disassembled mill. Every part separated and accessible—corrugated liners exposed for easy cleaning, exchange or replacement.

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HEYDEN'S
NEW POLYOL
FOR SHORT OIL
ALKYDS



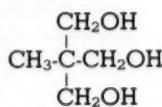
TME[®] Alkyds excel in:

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- Retention of color and gloss
- Heat stability
- Durability
- Amino resin compatibility

TME[®] is easy to process:

- Fast alcoholysis
- No decomposition
- Negligible volatile loss
- Free-flowing powder

Formula:



Properties:

Molecular weight—120.15
Appearance—white crystalline powder
Melting point—201°C.
Hydroxyl content—42.3%
Combining weight—40.2

Other uses for TME[®]: long and medium-oil alkyds; synthetic drying oils; polyesters, particularly those modified with diisocyanates; and resins for textile and printing ink applications. Technical bulletin and samples available on request.



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